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Learning Processes in Growth-oriented SMEs: the Portuguese Case

A thesis submitted to Middlesex University in partial fulfilment of the requirements for the degree of Doctor of Philosophy

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Table of Contents

List of Tables

List of Figures

List of Appendices

List of Abbreviations

AAGR - Annual average growth rate

AICEP – Agencia para o Investimento e Comercio Externo de Portugal (Trade & Investment Agency for Portugal)

AIMMP - Associação das Indústrias de Madeiras e Mobiliário de Portugal

APCOR – Associação Portuguesa de Cortiça (Portuguese Cork Association)

APICCAPS - Associação Portuguesa dos Industriais de Calçado, Componentes, Artigos de Pele e seus Sucedâneos (Portuguese Footwear, Components, Leather Goods Manufacturers' Association)

CEFAMOL - Portuguese Mould Industry Association

CEO – Chief executive officer

CFO – Chief financial officer

EC - Entrepreneurial capability

EMU - Economic and Monetary Union

EU - European Union

GBAORD - Government budget appropriations or outlays on R&D

GDP – Gross domestic product

GOF - Growth-oriented firm

GVA – Gross value added

HRST - Human resources in science and technology

IAPMEI – Instituto de Apoio às Pequenas e Médias Empresas e Inovação (Institute to Support Portuguese SMEs and Innovation)

ICT – Information and communication technology

IMF – International Monetary Fund

INESC – Instituto de Engenharia de Sistemas e Computadores (Institute of Systems and computer Engineering)

ISO - International Organization for Standardization

IVV – Instituto do Vinho e da Vinha (The Vine and Wine Institute)

MNE - Ministry of Foreign Affairs

OECD - Organisation for Economic Co-operation and Development

PROAGRI - European Agricultural Funding Programme

PRODER - Program for Rural Development

QREN - Quadro de Referência Estratégico Nacional (National Strategic Reference Framework)

R&D – Research and development

ROI – Return on investment

SII - Summary innovation index

SME - Small and medium size enterprise

USA / US – United States of America

UTEN - The University Technology Enterprise Network

VAT – Value added tax

Declaration

This thesis has been composed by myself and it has not been submitted in any previous application for a degree. The work reported within was executed by myself, and all information cited is acknowledged at the appropriate point in the text.

Statement of Copyright

Abstract

The learning processes that take place within small and medium size enterprises (SMEs) have attracted increasing attention among academics and managers. Growth-oriented SMEs in particular have been a focus of academic attention given their importance to processes of economic growth, although understanding of the learning processes within these enterprises remains limited, especially with regard to their interplay with intermediate and peripheral economic contexts.

This qualitative study, based on nine case studies of growth-oriented SMEs, provides important insights into the learning process which underlies their entrepreneurial capability and 'openness' to innovation across different sectors operating within the intermediate economic context of Portugal. The study analyses two different groups of SMEs, five from high tech industries and four from traditional manufacturing industries, to enable comparative analysis of how sectoral context can trigger different responses, learning processes and organisational outcomes. Primary data collection within the selected case study firms was undertaken through combining documentary sources with semi-structured interviews with owner-managers and other key actors. Qualitative analysis centred on gaining insights into processes of entrepreneurial learning and comprised both within-case and cross-case analysis.

The findings of this research contribute to knowledge on the learning processes within growth-orientated SMEs in intermediate economic contexts in three main ways. First, due to the constraints of the domestic economy, all companies internationalized whilst relying heavily on their in-house capabilities. In this internationalisation process, high-tech companies were characterised by more formal, decentralised and cooperative learning arrangements than traditional companies, which tended to be more 'closed' and showed simpler and more informal learning. Second, high-tech companies demonstrated a larger and more varying combination of learning processes compared to their traditional counterparts. In the high tech companies, learning was not only more systematic and more frequent, but also operated at a wider inter-organisational scope, with more radical change and a greater openness in terms of innovation. Third, the owner-managers were the principal knowledge gatekeepers of the learning processes through absorbing and disseminating external complementary knowledge and via varied learning modes. Owner-managers were therefore critical for integrating their entrepreneurial capabilities within the organisation and in moderating the firm's propensity to engage in 'open innovation'. This moderating role was accomplished by external interactive learning, internal planning and experiential learning. This augmented the firms' absorptive capacity – their ability to access and apply external sources of knowledge within their innovation processes – and entrepreneurial capability – their ability to identify, select, shape, and coordinate internal and external conditions and resources to explore opportunities.

These findings are of significance to owner-managers with regard to better addressing SME needs in terms of expanding their international business knowledge and stimulating greater regional cooperation.

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For any errors or inadequacies that may remain in this work, the responsibility is, of course, entirely my own.

Learning Processes in Growth-oriented SMEs: the Portuguese Case

1. Chapter one: Introduction

1.1. The learning process

It is largely accepted that small and medium size enterprises[1] (SMEs) contribute significantly to the general economy, and there is a substantial body of research addressing issues of SMEs' growth. One reason for research interest in SMEs relates to their limited resource (and knowledge) base and lower capability to shape their external environment (Smallbone et al., 2003; Huggins and Johnston, 2009). Their growth within turbulent and highly competitive contexts is often dependent on their being able to access external resources and support (Wyer et al., 2000). These characteristics are intrinsic to the particular character of entrepreneurial and organisational learning in SMEs and their ability to respond to opportunities and to grow (Penrose, 1959).

Growth involves the effective application of knowledge resources (Greiner, 1972, 1998; Churchill and Lewis, 1983; Scott and Bruce, 1987). Therefore, SMEs growth and learning are intrinsically linked at individual, team and organisational levels and, as stated by Deakins and Freel (1998, p.153) "the ability of the entrepreneur and entrepreneurial team to learn is crucial to the growth process". The learning activity of SMEs is often unplanned and unsystematic, processed by personnel or departments that predominantly organize other activities (Huggins and Johnston, 2009). While SMEs' knowledge contributes to their learning performance, entrepreneurs have the experience that allows them to identify opportunities (Wang et al., 2010; Penrose, 1959). Success in growing a business is thus dependent on how the entrepreneur learns from experience and also the existence of a supportive group of organisational collaborators. Learning in organisations is both an individual and collective process (Easterby-Smith et al., 2000) and can involve a tension between exploitation of efficiency-related routines (e.g.

[1]According to the EU Commission definition, an SME is a firm with fewer than 250 employees, while small firms have up to 50 employees (Curran and Blackburn, 2001). SMEs have been growing in number in Europe and have shifted their advantage from traditional manufacturing industry toward knowledge-based economic activity (Audretsch and Thurik, 2001). According to Instituto Nacional de Estatistica (2007), in Portugal, SMEs account for 99.5 % of the total number of firms and 74.7% of total employment, contributing to 59.8% of gross value added.

production efficiency) and more radical innovation involving the research and development of completely new products and procedures (March, 1991), and there may be a need to resolve tensions and crises that are ongoing and overlapping (e.g. involving debate and conflict around the focus of learning).

The literature on entrepreneurial learning focuses on the nature of individual learning, whereas perspectives on organisational learning emphasise that entrepreneurs are one amongst potentially numerous other actors involved in generating and distributing knowledge throughout the firm (Harrison and Leitch, 2005). Organisational learning occurs when the firm improves its performance through learning something new through collective mechanisms associated with the generation, distribution and institutionalization of knowledge (Jones and Macpherson, 2006). The concept of organisational learning is highly relevant to SMEs (i.e. with up to 250 employees) but it has been argued that owner-managers/CEOs are central to the learning processes of many smaller enterprises (e.g. Wyer et al., 2000). The concept of entrepreneurial capability (EC) combines those collective and individual dimensions of learning and has been defined as the firm's capacity to sense (the scale of the entrepreneurial individual), select, and shape opportunities, and synchronise strategic moves and resources (at the level of the firm) in pursuit of these opportunities (Abdelgawad et al., 2013).

The present study addresses the entrepreneurial and organisational learning processes behind the growth of selected SMEs. To better understand such processes the study examines the nature of various ways or modes of learning (e.g. 'by doing', trial and error), their scope (individual, group, organisational, inter-organisational) and the role of key contextual factors and events facing the selected SMEs. Absorptive capacity, a key concept related to the organisational learning theory, is here defined as the firm's ability to identify, assimilate, and exploit knowledge from the environment (Cohen and Levinthal, 1990). Although some studies found that, SME owners' experiences are contributing factors to their companies' knowledge absorptive capacity (Wang et al., 2010), little is known regarding the role of the entrepreneur in the process.

Among SMEs, growth-oriented firms (GOFs in further text) have recently attracted attention because of their positive relationship with growth and learning (Stam et al.,

2006). These are firms that intend to get bigger[2] and demonstrate greater capacity to create sustainable economic growth than other SMEs with limited growth prospects (Liao et al., 2003). These firms present significant economic characteristics a number of which they share with high growth firms: firms that grow at a high rate compared with most other firms, achieving annual growth rates in turnover and/or employment of over 20% for three consecutive years, which implies that they are largely responsible for national economic growth (BERR, 2008). As well as growing quickly, they are also intensive and rapid learners (Hitt et al., 2001; Sadler-Smith et al., 2001), showing greater innovative and absorptive capacities (Cohen and Levinthal 1990). This study examines a selected sample of growth-oriented SMEs in Portugal, an intermediate, more peripheral economic context with a relatively poor environment in terms of innovation strategy.

1.2. The impact of context

The role of growth-oriented SMEs as learning actors cannot be appreciated outside of the contextual characteristics of their operational environments, including their markets and other institutional/regulatory factors. Faced with different environmental constraints, SMEs tend to demonstrate distinct entrepreneurial capabilities (EC) while exhibiting varying depth of change in their final outcomes. These companies likely present a relative degree of 'openness' towards their environment (Dahlander and Gann, 2010). A basis for the idea of openness is that an organization cannot innovate out of context. It has to interact with different external actors to acquire tangible and intangible assets from the external environment in order to keep up with competition (Chesbrough, 2003).

Portugal, although a member of the European Union (EU), is facing at the moment of writing a serious economic crisis that has prompted the need for support under an international financial assistance program. This program was negotiated between the Portuguese authorities and officials from the European Commission, European Central Bank and International Monetary Fund. Portugal presents an industry profile that is mostly composed of SMEs. Their recent experience of the crisis has included a worsening of an already difficult access to finance situation (particularly long term

[2] dictionary.cambridge.org/dictionary

R&D investment) and in obtaining a qualified workforce, especially managers (Cabral, 2007).

The Portuguese indicators for business R&D fall short of the OECD median (Eurostat, 2012b) with a likely contributory factor here being the weak interaction between regional innovation actors (e.g. firms and universities) and a lack of a cooperative culture needed to underpin an effective regionally based innovation system (Santos, 2000). It seems likely, therefore, that successful growth SMEs have had to develop specific strategies and approaches in order to overcome the limitations of the Portuguese economic context and lack of an effective system for supporting innovation at national and regional levels.

The study of firms' learning processes and issues therefore has limited explanatory value unless we understand how such factors interplay with their specific operational contexts, identified by Edwards et al. (2005) as an under researched topic (Edwards et al., 2005). The entrepreneur, his or her firm, and the context can only be understood if considered jointly, as learning is localised. Consequently, exploration and exploitation of the different opportunities require different EC configurations. Close interactions and knowledge exchange between regional agents have been identified as crucial in dealing with the uncertainties attached to situated learning processes involving SMEs (e.g. Huggins and Johnston, 2009).

This study is particularly concerned to develop a more integrated understanding of the different levels at which learning occurs - entrepreneurial, organisational and inter-organisational. The earlier literature on growth in SMEs was principally focused on growth, strategic change, and entrepreneurial learning at the level of the individual enterprise (e.g. Hitt et al., 2001), but with increasing recognition of the importance of the firm's operational context, including relationships with other firms, including partners, suppliers and consultants (BERR, 2008; Etienne et al., 2008). Studies of Portuguese SMEs, on the other hand, have highlighted their tendency to be rather inward-looking, with little 'openness' in terms of innovation (e.g. exchange of ideas and resources with external actors), self-reliant and conservatively-managed (e.g. Santos, 2000). This raises the question of the role of the Portuguese context in relation to such tendencies – i.e. the extent to which it may hold some responsibility for perpetuating such orientations or, on the other hand, whether the more recent efforts of key

innovation/business support actors might be helping to challenge and transform such tendencies.

The learning process of growth-oriented SMEs is relational, and research into it requires a complementary perspective (Curran and Blackburn, 2001) to regard it as an emergent process that can be investigated by examining the context of each SME. Indeed, competition unfolds within a business ecosystem (e.g. sector) involving multiple players that differ in their strategies and capabilities but with a tendency to imitate successful cases.

It is necessary to gain a better understanding of the situated nature of knowledge acquisition and learning activity in SMEs. EC theory emphasises a need for a multilevel perspective on the competitive arenas, their context, and the agenda of different players (e.g. customers and suppliers) (Abdelgawad et al., 2013). Similarly, 'open innovation' theory focuses on relational interactive processes between firms or in collaboration with knowledge creating institutions, such as universities, both at domestic and international levels (Wynarczyk et al., 2013).

Nevertheless, existing research focuses mainly on large high tech companies with relatively few studies on 'open innovation' in SMEs (Wynarczyk et al., 2013). Also, the Portuguese SMEs, through their inward-looking stance, tend to operate within a rather closed innovation system, hardly share R&D knowledge with other regional actors (Lopes and Teixeira, 2009), which poses the question of what might be the sources of innovation to these companies.

The literature that examines less favoured or intermediate contexts is limited. Peripheral regions and less successful places have social contexts that differ from regions where such knowledge-based economic development theories have been mainly developed – in contexts that are well endowed with innovative actors and related institutional support. Peripheral regions have been an object of research, with the general argument being that they tend to be less competitive due to a lack of strength and depth in the precise factors that give leading regions their competitive edge, especially a high density of knowledge-based firms and a strongly networked business culture (Huggins and Johnston, 2009).

Some of the key challenges identified as restricting the learning process and growth capabilities of SMEs in peripheral regions include their limited internal resources and knowledge base; their heavy reliance of knowledge tacitly held within the firm, and an inward-looking fortress enterprise mentality resulting from a limited capability to shape and influence their external environment (Smallbone et al., 2003). While peripheral regions may not be innovation deserts, the evidence suggests that these regions do have specific problems. For example, apart from a lack of knowledge-based infrastructure, there can also be a lack of interactive learning among SMEs and between SMEs and other actors (Boekema and Rutten, 2007). Extant studies are often restricted to highlighting the existence of these external and internal actors rather than the connections between them.

Furthermore, SMEs from peripheral regions such as Portugal, with their rather closed innovation systems and related poor performance, tend to be short of international networking competencies (Teixeira et al., 2013) which, for instance, raises the question of what regional markets are targeted by these companies and why? It would appear crucial to examine such relationships across regional boundaries. *This thesis therefore attempts to gain greater contextualised understanding by examining the learning processes that are behind the growth of selected Portuguese growth-oriented SMEs.*

Although Portugal enjoys a fairly good physical infrastructure (road, rail, telecommunications), unemployment stood at 15.2% in the 2nd quarter of 2014; with low income per capita (39th position in the world[3]). The country also exhibits little intensity in terms of knowledge transfer between public institutions and firms (Capaldo and Fontes, 2001), which requires absorptive capacity in both provider and recipient (Boekema and Rutten, 2007). Although existing theory has highlighted the importance of such knowledge transfer, there is insufficient attention in the literature to the importance of addressing an intermediate developing context in ways that enhance learning and subsequent growth in SMEs'. *The current research aims to bring additional understanding into how a particular geographic, industry and innovation context influences the learning processes and subsequent growth of SME.*

The study explores this two-pronged perspective on the learning process and growth of SMEs to understand how they are influenced by contextual factors (e.g. lack of

[3] International Monetary Fund, 2012.

cooperation between firms, difficulty in accessing knowledge and financing, lack of qualified workforce) within a peripheral/intermediate context that may be lacking in the systemic elements needed to promote effective knowledge transfer. Organisational and entrepreneurial learning and context may be understood as complementary perspectives, (combined within the firms' EC), to explain the importance of learning processes of growth-oriented SMEs. Different problems and opportunities might demand distinct solutions, according to the regional context (Claire and Wintjes, 2002). Likewise, how firms′ ECs are configured is likely to vary in response to the nature of the contextual opportunities and constraints faced (Abdelgawad et al., 2013). For instance, the lack of cooperation between Portuguese SMEs might be overcome through new capabilities in achieving partnerships (e.g. alliances) whilst the lack of qualified workforce (e.g. managers) could be addressed by gaining new competences by 'on the job' training.

1.3. Research framework

This research investigates the learning processes of GOFs by utilising an approach that combines organisational learning theory with entrepreneurial learning theory while emphasising the role of the innovation context. It is proposed to view the learning process in terms of the constraints and opportunities experienced. The outcomes of learning experiences are likely to reflect the firm's accumulated knowledge and ability to deal with uncertainty and novelty and its relations to customers and other actors. The study aims to ascertain the drivers of firms' learning behaviour and consequent growth. In the light of these concerns a main question emerged:

1. *What is the nature of the learning process in Portuguese growth-oriented SMEs?*

In this study, learning processes are considered in terms of the critical events and challenges faced by SMEs, as identified in the literature (Claire and Wintjes, 2002): accessing finance/risk sharing; technology/technical know-how (e.g. access to technology centres); qualifications/personnel (e.g. the ability to attract highly skilled workers and exchange of knowledge); market access/information (e.g. collaborative orientation and networking); and organisation/strategic capabilities (e.g. management and staff training). Learning events are localized and situational according to different innovation contexts, for instance in terms of institutions and sources of support (e.g.

investment in science, technology and innovation) (Reuber & Fischer, 1999). Moreover, firm's absorptive capacity - its ability to accumulate and apply knowledge – is likely to be a key influence with respect to how firms cope with those learning events (Cohen and Levinthal, 1990). Effective learning in SMEs, contributing to the development of new capabilities, as well as outcomes in the form of successful innovations, therefore depends on being open to sources of new external knowledge and having the capacity to integrate it with internal knowledge on a continuing basis. In this way, innovation context and the organisational learning concept of firm's absorptive capacity seem to be also interrelated, giving rise to a further research question:

1.1. *What is the influence of context on learning processes?*

Previous research has shown that the learning and growth processes of SMEs are characterised by significant and critical learning events relating, for instance, to change in terms of competition or regulation. Additionally, the ability of entrepreneurs to apply relevant knowledge as a result of experiencing these learning events will partly determine success (Deakins & Freel, 1998). Although critical learning events, such as the collapse of a firm's market, have been shown to trigger learning with ensuing structural change in terms of organisation, strategy and innovation (Cope, 2003), there remains a lack of understanding of the specific learning processes associated with such exceptional experiences and how they sustain effective entrepreneurial capabilities (Zahra et al., 2006; Abdelgawad et al., 2013). This, in turn, gives rise to another question:

1.2. *What is the role of (and relationship between) entrepreneurial and organisational learning in responding to critical contextual events and challenges in Portuguese growth-oriented SMEs?*

First, SME's ability to learn is influenced by its innovation environment, which presents different critical events and types of support (e.g. Hassink, 2005). Secondly, the concepts of absorptive capacity and different learning modes and scope, allows a better understanding of the process of acquiring and transforming knowledge that is behind firms' growth (e.g. Zhang et al., 2006). Finally, the entrepreneurial learning approach underscores the role of the entrepreneur and other key actors in dealing with the firm's

external and internal events (Cope, 2003; Abdelgawad et al., 2013). Hence, another central question emerges:

1.3 How do we best conceptualize the learning processes in growth-oriented SMEs?

To summarise, the goal of this thesis is *to understand the learning processes of growth-oriented SMEs, within the peripheral, geographic and industry innovation context of Portugal*. Furthermore, we seek to understand *how key actors within GOFs and types of knowledge influence such learning.*

1.4. Summary of methods

Large organisations have tended to receive more attention from researchers than have small businesses. Consequently, the study of small businesses is an area that requires more directed and theoretically grounded research (Curran and Blackburn, 2001). Moreover, quantitative studies have been ineffective in explaining causal relationships – the 'how' question – relating to SMEs' learning processes and context (e.g. Sadler-Smith et al., 2001; Liao et al., 2003). Given that quantitative research does not fully capture the causality of the process-oriented learning phenomena in GOFs, this study is based on a qualitative approach given the importance of subjective meanings and actions to the phenomena under investigation (Eisenhardt, 1989).

A multiple case study design was adopted (Yin, 2003) to explore, describe, and explain the phenomena under examination. The case study approach allows a holistic understanding of relational and structural processes of organisations embedded in their contexts (Yin, 2003), thus allowing us to directly experience, enquire of and examine the phenomena in question (Wolcott, 2009). The longitudinal approach of the research allowed organisational change to be examined over time, and to capture the business processes that underpin learning within SMEs (Zhang et al., 2006).

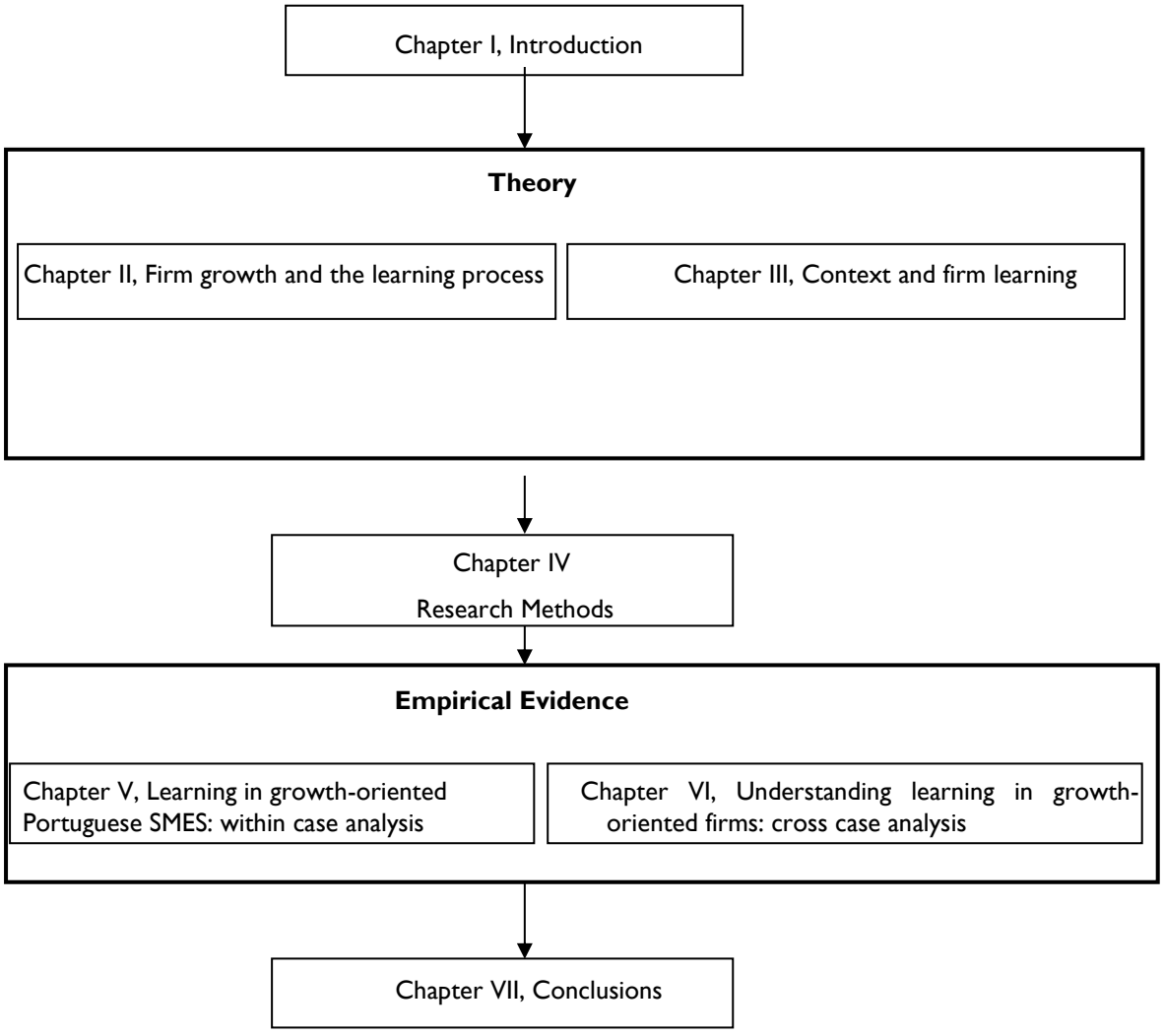
Nine case studies of growth-oriented SMEs from different industries were selected for in depth study; five are high tech firms and four are from traditional sectors - one from the cork industry, one from the wine industry, one from the footwear industry and another from the mould industry. The sources of information were semi-structured interviews plus documentation. These data were collected between 2007 and 2013, with

the interviews being conducted between 2009 and 2013. The analysis was guided by previous relevant literature. Case studies were analysed using both within-case and cross-case methods (Miles and Huberman, 1994) and matrices were used to present the corresponding analysis of the learning processes of the firms.

1.5. Organisation and structure

Organisational learning theories identify knowledge and learning as valuable assets that play a key role in enterprise growth. This dissertation is structured as follows (Figure 1.1):

Figure 1.1 Thesis Structure



Chapter One introduces the background to study, the theory, the research objectives, research questions, research approach, and structure of the study.

Chapter Two reviews the literature on business growth, growth-oriented SMEs and organisational learning. Growth-oriented ventures are examined in terms of their economic profile and what is known about factors relating to owner-manager characteristics, size, age, way of growing, and industries where they operate. Their above average propensity to learn and related innovation activity were described as well as their close dependence to the external environment (e.g. Stam et al., 2006). Organisational learning theory is drawn on to explain the varied processes by which SMEs learn (and grow), with particular reference to the concept of absorptive capacity – how firms identify, prioritise and apply relevant external knowledge (Cohen and Levinthal, 1990), combined with insights from entrepreneurial learning theory, which emphasises the role of individual learning and the firm's entrepreneurial capability (e.g. Cope, 2003; Abdelgawad et al., 2013). Contextual-institutional factors are also identified as having an important impact on SME learning. The study aims to develop an integrated understanding by synthesising the above perspectives. There is also value in distinguishing between aspects of the learning process that relate to the types of knowledge involved (e.g. whether business/marketing or R&D related), modes (e.g. ways of acquiring knowledge, such as by networking, searching, etc.) and scope (e.g. at team, organisational and inter-organisational level) (Zhang et al., 2006).

Chapter Three examines the importance of context to firms' learning, drawing upon recent theories of interactive learning and the concept of 'open innovation'. Integrating the notion of context with concepts of entrepreneurial and organisational learning previously discussed, a conceptual framework to inform the study is set out. The rest of the chapter then considers the elements of the Portuguese national and sectoral context which are relevant to understanding the learning processes of the growth-oriented case study SMEs analysed in chapters five and six.

Chapter Four presents the research approach and methodology adopted. The rationale for the chosen paradigm, the selection of the case study method, and the sampling of growth-oriented SMEs is discussed, including a short profile of the case study SMEs. Methods of data collection, validity and ethical issues are discussed in detail.

Chapter Five present the case studies, focusing on their origins and knowledge base, growth and related learning processes and outcomes using the single case analysis.

Chapter Six present a cross case analysis of the case study firms. Through in-depth examination of the characteristics, learning behaviours, adaptations and outcomes of a sample of GOFs within Portugal, a model of the learning process in growth-oriented SMEs in peripheral/intermediate contexts is presented and discussed.

Chapter Seven concludes the thesis and summarises and discusses its findings. It also adds insights to the business and management literature and discusses the limitations of the study.

2. Chapter Two: Firm growth and the learning process

2.1. Introduction

This chapter reviews the literature on growth, growth-oriented firms and organisational learning. It was important to review these streams of literature for the purposes of the study as, according to Leitch et al., (2010), previous literature has insufficiently addressed the qualitative aspects of how different SMEs grow. Learning and growth are complex phenomena, therefore the study of growth-oriented SMEs necessitates a multi-faceted approach in order to gain a better understanding of the processes involved.

The chapter begins by reviewing the literature on the stages of business growth and their determinants. The issue of growth has initially been addressed through the concept of '*life cycles'* (e.g. Greiner, 1972), although this approach has been criticised. Later developments have reformulated these initial models and contextualized them in order to make them more compatible with the insights from organisational learning and growth theories, particularly with respect to how organisations respond to crises and events.

Second, the chapter examines what is known about growth-oriented SMEs, with particular reference to learning and growth theory and the importance of context, i.e. in terms of business networking and milieu (Etienne et al., 2008) and issues relating to infrastructure and support policies (e.g. Littunen and Tohmo, 2003). Third, drawing on the organisational and entrepreneurial learning literature, the chapter examines the importance of learning to firms in general, the concept of absorptive capacity - firms' ability to identify, absorb and apply new knowledge – and the concept of entrepreneurial capability. In other words, the firm's overall capacity to sense, select, shape, and synchronise internal and external conditions and resources for the exploration (recognition, discovery, and creation) and exploitation of opportunities.

2.2. Conceptualising business growth

A growing body of literature has addressed the importance of learning to business growth and how firms apply new knowledge in order to achieve strategic goals (Sadler-Smith et al., 2001). The organisational learning literature, as for instance Zhang et al., (2006) in attempting to conceptualize the learning process in SMEs, has increasingly

focused on interactions between the firm and external sources of knowledge and support factors on the firms' learning processes. However, McKelvie and Wiklund (2010) claim that most studies consider the firms' growth process as a '*black box'*, neglecting the specific learning processes which have enabled growth over time.

The notion that firms have sequential life cycles was introduced by Greiner (1972, 1998) who focused on the changes in intra firm variables such as age, size, and rate of growth. His life cycle model presented a three stage theory involving inception, growth and maturity and was based on the assumption that growth occurs in a linear fashion and can be divided into discrete stages. According to Greiner (1972), each phase contains a relatively calm period of growth that ends with a management crisis (creativity, direction, delegation, collaboration and coordination phases). Since each phase is strongly influenced by the previous one, management with a sense of its own organisation's history can anticipate and prepare for the next developmental crisis. Later, the author added a possible sixth phase, in which growth depends on the design of extra-organisational solutions other than organic growth, such as creating a holding company or a network organisation (Greiner, 1998).

Churchill and Lewis (1983) similarly presented a model based on five phases: *start-up*, in which the main problem is to gain customers and deliver the product; *survival*, where efforts are directed to the achievement of the '*breakeven point*' between revenues and expenses; and the *success* phase, where the focus is on exploitation and expansion. If successful, the phase of *launching*, is dominated by concerns on how to grow rapidly and how to finance that grow; and finally the *resource maturity* phase, involves the consolidation of the enterprises financial gains and further responding to changing markets with flexibility and rapidity (Churchill and Lewis, 1983).

Others, Scott and Bruce (1987), building upon the Churchill and Lewis' five phases model, argue that all firms have the same growth behaviour, deal with standardized events as they become more complex, and need to overcome similar changes in order to advance to the next stage. First, they posit a start-up phase in obtaining clients; next a survival phase of critical revenues and expenses; a phase of growth, in which the critical issues are managed to grow and ensure resources. Then, a phase of expansion, centred in financing growth; and finally a phase of maturity, of productivity and expenses control. Scott and Bruce thus propose a more prescriptive model of small business

growth to enable small business managers to plan for future growth whilst emphasizing problem resolution and the need for an entrepreneurial approach.

A number of authors (e.g. Kazanjian and Drazin, 1990; Rutherford et al., 2003) have subsequently argued that such models oversimplify the complex combination of internal and contextual factors that affect small business growth and, although linear patterns and organisational growth paths can be discerned in terms of distinct stages and problem configurations, actual realistic progressions from one stage to another require complex bundles of organisational capabilities. Specifically, Kazanjian and Drazin (1990) argued that the structural characteristics of firms are likely to play a key role in their ability to respond to the various problems presented at different stages of growth.

The correspondence between the stage and its typical problems in these models is challenged by evidence from other studies. For instance, Rutherford, et al., (2003) in a study about the role of human resource management over firm's life cycles, concluded that the firms' age was not a significant indicator of stage. Furthermore, Miller and Friesen (1984), in a longitudinal study on the firm's life cycle, identified five key stages of the firm life cycle: birth phase through product innovation; the growth phase as evolving toward a more formalized structure; maturity in its efficiency behaviour; a revival phase of product market diversification; and a decline phase as markets dry up. They claimed that, although inter-stage differences resembling those identified in previous literature could be discerned, the patterns they identified could not be neatly matched to existing linear models involving discrete and well-defined stages (e.g. the maturity phase may be followed by decline). That is to say, crises and issues were found to occur randomly throughout the firm's life and not necessarily involving a progressive path of resolution and subsequent growth; indeed, there was also evidence of firms regressing to earlier stages of the suggested models.

A better understanding of how business growth is influenced by contextual events and of the entrepreneurial and organisational strategies and processes that underpin or constrain growth is thus paramount. Penrose (1959) originally identified internal conditions such as managerial ability, and external factors such as markets that are both influential in how enterprises change and grow in response to critical events (Penrose, 1959). Also Nicholls-Nixon (2005), in a study on management practices to better deal with rapid growth, posited that firms' growth and success depends on the way events

and crises are dealt with, emphasising that the focus must be on the nature of growth and learning events, rather than on abstract evolution stages of life cycle. Likewise, the nature of learning seems to be more related to diverse issues than with life cycle categories. It is notable that the literature on GOFs emphasises issues such as the need for resources and demand for organisational change (Liao et al., 2003). In addition, there is a need for more attention to how the issues are faced and subsequent learning processes need to be understood in terms of contextual factors as well as firms' internal characteristics (Macpherson and Holt, 2007).

To summarize, sequential growth models fail to capture the complex and multilevel reality of firms' growth and learning and the interplay of these in different types of firms and contexts. The heterogeneity of enterprises, including in terms of their diverse contexts and experiences, also makes it difficult to draw clear process implications. Life cycle models suppose that growth involves a sequential progression through distinct stylised stages, saying little about the non-linear learning processes that support firms' growth and evolution over time. They do not provide a complete perspective of growth as they neglect relevant contextual learning triggers, as if the inherent quality of organisations was enough to progress through pre-determinate stages irrespective of context. Finally, life cycle models focus on the organic growth of the firm and neglects other possible outcomes, such as spin outs, acquisitions, strategic alliances, licensing and franchising. GOFs have attracted particular attention not only because of their contribution to growth but also due to interest in their way of dealing with environmental issues in circumstances that are likely to be more turbulent than those experienced by most other enterprises (Liao et al., 2003). The following two sections further examine the distinctiveness of GOFs and what is known about learning processes in SMEs.

2.3. Growth-oriented firms

2.3.1. Conceptualization

Put simply, GOFs are enterprises which demonstrate greater desire to grow at a higher rate than the majority of firms. However, according to Leitch et al., (2010), firms' growth is difficult to predict, and a better theory of business growth needs to be developed shifting the emphasis from '*what growth'* towards the '*how'* of growth,

focusing on the learning processes behind diverse growth experiences. Given the understanding of the heterogeneity of SMEs, there is a need to attend to firms distinctive characteristics in diverse contexts (Smallbone et al., 2003). Also, Delmar et al., (2003) posit that growth can take forms as recorded by differences in various indicators such as profit, sales, employment, market share, physical output, and assets, making it difficult to standardize one criterion. For example, in the substantial literature on high growth firms, there is no agreement as to the definition of what constitutes high-growth. Smallbone et al.'s (1995), for instance, refer to firms which more than double the sales turnover in real terms to a minimum of £10.5 million over an 11-year period (1979-1990); Storey (2001) includes £5-10 million sales growing over 25% yearly for smaller firms or £10-100 sales growing over 15% for larger firms, for at least four consecutive years; and Birch et al., (1994) support the 25% criteria.

The OECD (2007) proposes the following definition for high growth: *'All enterprises with average annualized growth in employees or gross sales greater than 20% per annum, over a three year period'*. For the purposes of this study, we follow the OECD in utilising gross sales as a key dimension in identifying enterprise growth because it is the most widely used indicator and is relatively accessible. Moreover, sales tend to be favoured by the entrepreneurs themselves, rather than growth in other indicators (Delmar et al., 2003).

Additionally, BERR (2008) defines firms with high growth in terms of two basic characteristics: 1) they are found to contribute significantly to employment growth; 2) and they display higher levels of productivity than average. The combination of these two attributes provides tremendous economic significance to GOFs due to their potential relative contribution to economic growth. Moreover, they attract much interest because they tend to produce indirect and spill-over effects as in the case of growth-oriented technology firms (Schreyer, 2000). Specifically, due to their potential for faster growth, they tend to grow by spinning out or acquiring other firms too, which often evolve towards localized industry agglomerations. At the same time there is a need to acknowledge that the criterion of sales growth, together with these main characteristics, are insufficient to describe GOFs, which hold many other features of interest to enhance. The next section examines the literature on GOFs in greater depth.

2.3.2. Towards a theory

The combination of high sales and employment growth implies that GOFs are responsible for a substantial proportion of economic growth. However, despite their economic importance, according to Henrekson and Johansson (2010), little empirical evidence has been recorded regarding these firms. The OECD (2007) identify a total of 20 studies about '*Gazelles*', a subset of growth-oriented enterprises up to five years old, published after 1990. The contexts of research were divided all over the USA (5 studies); Canada (3 studies); Finland (3 studies); Germany (3 studies); UK (1 study); France (1); Italy (1); Netherlands (1); Spain (1); and Sweden (1). Most of these were conducted in developed national contexts that are relatively well favoured in terms of supportive programs and infrastructure, including, for instance, in terms of access to seed capital and knowledge transfer mechanisms. There is therefore a shortfall of studies on growth-oriented ventures in peripheral regions. Nonetheless, some general findings emerge on the nature of GOFs that are summarised in the Table 2.1:

Table 2.1 Main features of growth-oriented firms

The majority of studies report GOFs to be crucial for net job growth. They generate a large share of all new net jobs;
SMEs are overrepresented amongst growth-oriented firms. Because of their small/medium size - and resources - SMEs tend to be relatively entrepreneurial, fast learners, and even more if considering their low R&D expenditures. Nevertheless, GOFs are of all sizes;
Owners are on average more educated and entrepreneurially experienced;
GOFs are younger on average;
GOFs generally evolve in well supportive contexts;
GOFs are more innovative and more active in learning;
GOFs are present in all industries and overrepresented in young and growing industries;
GOFs learn more by interacting and are strongly integrated in networks, either formal or informal ones;
Young and small GOFs grow organically – recruiting instead of acquiring - to a greater extent than large and old GOFs, and therefore make a larger contribution to net employment growth.

Source: adapted from OECD (2002) and Liao et al. (2008)

According to Moreno and Casillas (2007), these main features tend to give the appearance of a standardized, ideal enterprise which does not, in fact, exist, or if it does, it is the exception rather than the rule. From our previous discussion, GOFs are likely to display other characteristics that do not resemble a "*model*" firm, such as idiosyncratic

company histories and industry characteristics that shape their learning process and ensuing heterogeneity.

Firstly, the available evidence suggests that SMEs which display strong growth struggle to maintain a high growth rate in the long term. It shows for instance that significant gross job gains can co-exist with large gross job losses in firms which, although initially displaying high growth, may subsequently exhibit rapid decline (Schreyer, 2000). Secondly, GOFs are not always young; for instance Acs et al., (2008) found the 'gazelles' in their study were on average 25 years old. Thirdly, while some studies suggest that GOFs are unlikely to be found in areas that are not centres of economic activity, other evidence indicates that GOFs can be found in declining industries, recession periods and less favoured regions (Henrekson and Johansson, 2010).

Nevertheless, it is not clearly the case that wealthier innovative regions lend themselves to creating larger GOFs – e.g. high tech industries. It is easier to grow in contexts where funding comes more easily, which is critical in determining the investment and innovation performance (BERR, 2008). However, the evidence also indicates that many GOFs exhibit relatively stable paths of development even during economically difficult periods, suggesting the critical role played by firms' internal learning processes in adapting to contextual challenges and events. Finally, Schreyer (2000) confirms that GOFs show marked variance in their characteristics and how these are shaped by different contexts. Firms that require or benefit from proximity with key external actors (e.g. clients, suppliers and partners) tend to present a rather distinct profile along with their different context (Schreyer, 2000; Etienne et al., 2008).

The characteristics of growth-oriented SMEs presented above are shaped by diverse actors - in which the owner-manager is central - and by the learning processes that support growth. Firm growth has been found to be driven by the creation and application of knowledge with the contribution of diverse organisational, inter-organisational actors and regulatory institutions (Henrekson and Johansson, 2008). The evidence of their learning through networking suggested the relevance of diverse perspectives on learning (e.g. Morgan, 1997) to investigating the processes and interactions involved, including with a range of external actors, such as other firms, consultants, and sources of support.

2.3.3. The learning process

The BERR (2008) report on firms that exhibited periods of high-growth identifies the role of a strong learning process with respect to their operational contexts and related institutions. Context is only part of the learning process; and the differences in external environments are insufficient to explain growth performance (Smallbone et al., 2003). There is also a need to consider firm level learning processes and how these enable enterprises to respond to different external constraints and opportunities and hence, sustain their growth.

Etienne et al., (2008), in a study of factors associated with growth, posit that firms that demonstrate higher growth are market oriented and, unlike most growing firms, they innovate rather than imitate - often on the basis of close client relations, customised products - and tend to grow through market penetration, which overall reflects a need to stay close to customers. Smallbone et al., (2003) contend that a key distinguishing feature of well performing firms is the entrepreneur's motivation and commitment towards growth. Also, Stam et al., (2006) claim that high levels of qualifications and management skills are key factors in growth, since individuals with these traits find it easier to access finance. Smallbone et al.'s (1995) suggest that managers motivated towards growth are very competent in adaptively positioning their firms in relation to contextual factors. Indeed, other studies found that owner-managers committed to growth are able to develop a structure that enables '*self-organizing*' learning, for instance by creating systems to absorb external knowledge and emphasizing relationship building (Nicholls-Nixon's, 2005).

Thirdly, the evidence indicates that organisational learning is particularly intense in growth-oriented firms. Such enterprises are usually characterized by a relational and participatory organisation, with relatively horizontal structures and organisational cultures that encourage participation - all these factors seem to be prerequisites for achieving and sustaining growth (Stam et al., 2006). In addition, Barringer et al., (2005) found that an efficient human resource management and a successful entrepreneurial narrative were shown to be related with growth orientation. However, the relative importance and relationships between these factors is difficult to demonstrate, and the processes of learning remain unclear. Zahra et al., (2006) found that the capability to acquire and successfully use external new knowledge is particularly important to a

GOF. This study analyses the learning processes behind GOFs' growth, within a particular context.

Fourthly, although GOFs tend to grow organically, evidence suggests that they can also grow through external alliances and partnerships, particularly as a result of learning by interaction (McKelvie and Wiklund, 2010). Alliances, either formal or informal, may be entered into with a wide variety of actors – customers, suppliers, competitors and public or private research institutions – and appear to be both more frequent and varied in GOFs (Stam et al., 2006).

Finally, successful innovation in GOFs seems to be an outcome of combined entrepreneurial and organisational learning in which owner-managers play a key role. The BERR (2008) report states that firms that show high growth tend to respond to their customers' needs through innovative and precise ways, reflecting their intense learning process. Therefore, innovation plays a key role in the firms' growth process, by which they combine external and internal knowledge to commercialize new technologies (Wynarczyk et al., 2013). Indeed, entrepreneurial capability is more evident in proactive companies that show more decentralised decision making, while creating novelty through collective efforts (Abdelgawad et al., 2013).

2.3.4. Environment and local/regional context

The existing evidence shows that GOFs owe their success to idiosyncratic firm level and environmental factors, and thus their growth is difficult to predict, support, and transfer to other firms. According to Fisher and Reuber (2003), in their study on how growth-oriented firms can be supported, two groups of individuals have particular interest: owner-managers as the result of their self-interest as managers; and external resource providers such as suppliers, labs, research centres, or universities. Also, Bartelsman et al., (2005) claim that domestic institutions, with varying differences in regulation, taxation, and financial industry, play a key role in shaping business and employment growth. Others have argued that a place can only be competitive through the presence of localized, place-specific knowledge, which also requires knowledge sharing among regional actors (Boekema and Rutten, 2007).

Some (e.g. Chesbrough, 2003) claim that the success of a firm depends to a large extent on its openness in terms of the external flow of technical information with a number of

stakeholders in its vicinity (e.g. science parks, incubators and university). However, more recent contributions around 'open innovation', following Chesbrough (2003), reiterate the case that in order to achieve competitive advantage, enterprises need to be open to external knowledge as well as drawing on internal ideas. Although the notion of 'open innovation' has gained considerable recent traction with other academics/researchers, it builds on the contributions of numerous previous studies rather than representing a genuine breakthrough in understanding (Dahlander and Gann, 2010). For example, Oakey (2013) in his study of 'open innovation' in high tech companies found that this openness of innovation transfer is less open than suggested initially. In fact, many firms demonstrated a prudent degree of openness, absorbing external complementary knowledge, while also relying heavily on processes that could be characterised as involving a 'closed' approach to innovation, particularly given the need to conceal and protect their knowledge on product development since it constitutes a key asset.

In this vein, growth-oriented ventures could be better supported by targeting their different innovation-related needs, for instance in terms of managerial competences, support for internationalization, funding, intellectual property protection (IPP) and technically talented people (Stam et al., 2006). It is argued that supporting directly GOFs is better for job creation rather than the providing of general business support (Stam et al., 2006; Hart et al., 2009). Reuber and Fisher (2003), on the other hand, suggest that it would be unwise to focus entirely on GOFs as economic growth is owed to all SMEs in general and also, their owner-managers tend to avoid information from institutions or consultants, who they do not trust entirely. The evidence and related argument suggest that the multidimensional phenomenon of GOFs means that it is difficult to '*pick winners'* and predict which firms will be successful and sustainable in the long term.

The BERR (2008) report shows that most growth-oriented enterprises that intended to grow above the average fail because of constraints such as lack of access to appropriate financing, lack of skills, weak investment in innovation, lack of demand and poor understanding of market needs. In this way, access to resources can moderate the intentions and realizations of growth. A better understanding in how growth is

influenced by the access to resources is therefore paramount in order to encourage potential entrepreneurial initiatives (Stam et al., 2006).

In short, how to promote economic and employment growth has lately been a key concern. The capacity of firms and other regional actors to learn from each other in order to overcome barriers and respond to opportunities has been emphasized. However, since growth is a multilevel concept, it is crucial to not only focus on how much a firm grows as reflected in quantitative indicators such as sales, size, or profit, but also in how it grows, in order to understand the heterogeneous nature of growth and '*what happens while a firm grows?*' (Henrekson and Johansson, 2010).

Specifically, the process of growth is distinct for diverse firms and, therefore, the learning processes that support growth are likely to vary considerably as well. For instance, if a firm internationalizes through partnership its learning processes would rely principally on interactive learning (e.g. by networking). Conversely, if it internationalizes incrementally it would rather favour tentative learning (e.g. by trial and error). Growth could be characterised as being bound up with processes of interactive learning and absorption of new knowledge, particularly from external agents – e.g. clients in responding to requirements, distributors, suppliers, and parent groups (Reuber and Fisher, 2003). Hart et al., (2009) for instance, in a study about the economic impact of growth-oriented firms, claim that there is a need to investigate these firms more thoroughly with respect to their learning processes and local context.

Furthermore, a number of studies have shown how the local texture of interdependencies between SMEs and the local community can originate a particular regional economy. For instance, Boekema and Rutten (2007) posit that firms are rooted in their territory, relying on its historical development and, thus, the idea of '*embeddedness*' is a key analytical concept in understanding the functioning of economic regions. In this way, learned skills become partially embedded in habits, which grow into routines or customs – or conventions – and become a common part of a social culture (Storper, 1995). The tacit nature of new or innovative knowledge and the localness of much tacit knowledge make, therefore, the knowledge difficult to tap into from a distance or to transfer to other places. Additionally, trust and mutual understanding reinforces local inter firm cooperation, making it even more difficult for outsiders to imitate (Boekema and Rutten, 2007).

Such regional idiosyncrasy, however, cannot be built solely on local knowledge and competences. Typically, studies of successful regions show how crucial it is to have links with the non-local, outside world, as well. R&D activities, for example, can be a linking pin between the local and the non-local, demanding high receptive and absorptive capacity through significant gatekeepers (Vickers and CordeyHayes, 1999). External connections rely on intermediaries (e.g. wholesalers), who buy and sell local products outside the region, bringing new information and competing products back to the region, acting as bridges that cross industry lines (Boekema and Rutten, 2007).

GOFs present therefore, a complex interplay of learning and growth, with their wider context that require further research (Henrekson and Johansson, 2008). Liao et al., (2003), for example, were able to ascertain general features of GOFs but, due to the extensive nature of their approach, did not provide causal inferences, or interdependencies between factors. Such interrelations can only be revealed through a qualitative study. This research intends therefore, to explore the learning process behind GOFs growth and success in a different context, that of Portugal. This contextual dimension is discussed in detail in chapter three.

2.4. The learning process in SMEs

What exactly is learning? According to Collins COBUILD Dictionary[4], "*learning*" is defined as "*The process of gaining knowledge through studying*". Notwithstanding, this learning cannot be considered as merely the acquisition of a set curriculum. If one examines job advertisements, it becomes obvious that general skills are also considered as being at least as influential as academic qualifications. Furthermore, in business, the concept of capability has been preferred to learning (Illeris, 2003).

According to Wenger (1998), learning should be broadly understood as resulting from the acquisition of relevant knowledge and skills plus a range of personal qualities and the ability to implement all this in either well known, or unknown situations. That is, learning can be conceived as knowing how to act in a domain of action. Such a concept covers all processes that lead to changes in what one knows and is able to do; whether they are of cognitive, emotional, or social nature, and are not due to genetic or biological maturation (Illeris, 2003).

[4] www.collinslanguage.com/.../english-co build.aspx

Such broad definition of learning encompasses matters such as personal development, the acquisition of qualifications and socialization, as well as ways of learning when approached through different lenses. Learning can take place through various interactive processes, namely external between learner and environment, and internal between individual knowledge acquisition and knowledge connection to prior learning. Illeris (2003) claim that learning encompasses the cognitive dimension of knowledge and skills, the emotional element of motivation, and the social aspect of communication, all embedded in a social-situated context. The most effective way for individuals to develop a strong sense of competence is, therefore, by mastering experience, observational learning, and social experience (Erikson, 2003), although many learning theories are confined to one of these views. This is the case of traditional cognitive and behaviourist learning theories that focus strictly on the internal psychological process, and is also the case with social learning theories, focused strictly on the external process of interaction and with the 'socially constructed' nature of situated learning (Lave and Wenger, 1991).

The view taken in this study is that learning must comprise cognitive, emotional and social processes. The cognitive dimension covers the learning content in terms of knowledge and skills and helps to cope functionally with change in practical life. The emotional dimension embraces mental balance and sensibility and is influenced by understandings - while learning cognitively is driven by emotional motivation. The social dimension of learning involves the social integration of the learner. Learning events are stretched out between those three processes and force the subject to go beyond his/her current state (Illeris, 2003). Moreover, learning always occurs within specific contexts that offer diverse learning possibilities in terms of stimuli and barriers.

Learning possibilities and challenges are idiosyncratic, and in this way learning always takes place in socially shaped contexts. According to Harrison and Leitch (2005), the ontology of learning is therefore different in diverse cultural contexts. This point of view is corroborated by Cope (2003), who argues that different critical events and affective/social characteristics form distinct outcomes. Similarly, Wenger (1998) posits that there is no universal explanation that adequately represents the dynamic interaction between the external and internal aspects of learning in communities of practice, defined by *"groups of people who share a passion for something that they know how to do, and who interact regularly in order to learn how to do it better"* (Wenger, 2004, p.

2). Besides the constructed meanings, this practice perspective also acknowledges the activities and practices that underpin the learning processes. There is thus a need of research to address processes rather than just the personal or situational attributes of cognitive, emotional and social dimensions.

Different levels of learning were identified by Illeris (2003) in the process of acquiring knowledge from particular contexts which may range from c*umulative learning* applied to situations similar in the learning context (e.g. pin code number); *assimilative learning* when a new element is linked to the previous mental scheme; and *accommodative learning* that happens in the absence of relation with previous schemes, leading to the shaping of existing schemes in order to fit new events. Finally, *transformative learning* occurs when personality changes and learning is reconstructed in order to face an urgent crisis. These levels of learning can therefore be activated in different situations, resembling other authors' classification (e.g. Argys and Schon, 1978).

When then can learning be conceived as organisational? The above definition of learning reserves a significant role for the agency of individuals who are able to be seen as being capable of make a difference while taking into account individual, group and organisational understandings (e.g. Vickers and Cordey-Hayes, 1999), in which individuals draw upon in the process of making judgements. In this sense, Tsoukas (2005) posit that learning is organisational when generated, developed, and transmitted by individuals within organisations. Individuals draw and act upon a corpus of generalization in the form of generic rules that emanated from the organisation. Also, Huber (1991) claims that an organisation learns when any of its units identifies, acquires and applies useful knowledge. The learning process begins therefore at the individual level, in the assimilating of new knowledge and progresses throughout the organisation via sharing and communication (Cohen & Levinthal, 1990). Cohen and Levinthal (1990) define this capacity for successfully absorbing external knowledge, assimilating it and applying it for commercial ends as *absorptive capacity*. With regard to entrepreneurial capability, Abdelgawad et al., (2013) also emphasize the need for organisational embeddedness and that in order to effectively use their firms' capacity for strategic change, owner-managers should coherently integrate their diverse views within the organisation. Learning, therefore, needs to be understood in terms of the changing nature of the organisation and constitutes an integrative concept that can unify at once individual, group, and organisation levels (Dodgson, 1993).

The concept of a firm as a knowledge system, on the other hand, focuses on the services rendered by the firm's resources (Penrose, 1959). Hammel and Prahalad (1990), for example posit that there is likely to be considerable variation and discretion in how different firms could use their resources (e.g. R&D). It is argued that successful firms, relying on different capabilities, are able to configure their knowledge assets in ways that constitute a competitive advantage.

A number of authors (Chaston et al., 1999; Zahra et al., 2006) maintain that knowledge is what the firms know whilst "*capability*" is what the firms can do. The firm's ability to learn depends therefore on its capabilities in integrating organisational resources (Penrose, 1959; Fiol and Lyles, 1985). Penrose (1959) alleged that along this process, the perceptions and coordination of managers are paramount in achieving complementary effects as in improving the services rendered by resources.

Nelson &Winter (1982) identified that as the firm grows, the resources that underpin learning and also their various permutations also expand its potential combinations. However, existing routines can limit the set of combinations to implement and restrain as well the ability to recombine existing resources. These limitations can hinder learning beyond the span of the firm's previous knowledge (Cohen & Levinthal, 1990) and also tend to restrict learning to familiar areas (Cyert & March, 1963). Learning processes are therefore responsible for the evolution over time of two sets of organizational activities: the operational functioning of the firm and its existing routines*;* and the modification of those existing routines, through dynamic capabilities (Zollo and Winter, 2002). According to Zollo and Winter (2002), a dynamic capability is a learned and stable pattern of collective activity through which the organization systematically generates and modifies its existing routines in pursuit of improved effectiveness.

Indeed, the resource based theory, being much focused on internal factors, claims that organisations possess a unique configuration of resources and capabilities that, as suggested by Hitt et al., (2001), can constitute a framework for strategy, leading to sustained competitive advantage, particularly if costly for other firms to imitate. Grant (1996), on the other hand, presenting a knowledge-based view theory, argues that an organisation's most valuable resource is the knowledge embedded within it, which is critical to obtain a competitive advantage. In this vein, Nonaka et al., (2000) add that knowledge is paramount to success because it is a potential "*intangible resource*", hard

to imitate and transfer, that is created through interactions between different agencies (individuals, groups and their contexts/environment) resulting in knowledge that can be both tacit and explicit (codified).

Given that growth depends on the application of knowledge configured as resources (Penrose, 1959), the ability to access relevant knowledge is therefore a key competence of growth-oriented SMEs (Deakins and Freel, 1998). The channels by which external knowledge reaches the firm, which include the entrepreneur, firm, and social and business networks, are here identified by Macpherson and Holt (2007) as crucial. Moreover, any concern with how knowledge resources are developed to identify and respond to opportunities requires a longitudinal study to appreciate how firms and entrepreneurs interact within specific and of varying support contexts (Theyel, 2012). All of these factors are analysed in this study within a peripheral context.

SMEs, as knowledge systems, are constantly in tension since, as maintained by Cyert and March (1963) and March (1991), learning is a dynamic process involving ongoing judgments and trade-offs between improved efficiency in the short-term and more strategic considerations, of how to improve competitiveness, over the long term. On the other hand, learning, as suggested by Sadler-Smith et al., (2001), as introduces discontinuity in the knowledge process, increases as well the organisation's knowledge about possible alternatives, thus increasing the potential strategies, technological options and innovation.

Such tensions around learning pose significant challenges for SMEs and, according to Liao et al., (2003), the more competitive SMEs are those that are most able to effectively absorb relevant external knowledge and disseminate it at internal level. Additionally, GOFs which are likely to demonstrate high openness in terms of their internal and external knowledge resources, may need an effective knowledge structure, in order to deal with their high intensity of innovation and learning. These companies, as suggested by Cohen and Levinthal (1990) and Barringer et al., (2005) also seem to rely on previously acquired entrepreneurial knowledge. Indeed, although the owner-manager is revealed to be a key knowledge gatekeeper when it comes to sensing potential opportunities, the whole organisation is paramount in selecting and shaping opportunities, and synchronising strategic moves and resources in pursuit of those opportunities (Abdelgawad et al., 2013). It is important, therefore, not only to examine

the learning modes underlying individual entrepreneurial capability, but to see how entrepreneurial knowledge is integrated within the firm and, with regard to final outcomes, and to what extent.

In short, this section has reviewed the literature on how individuals and organisations learn, and the role of knowledge and learning in the SMEs' success and growth. These SMEs comprise individuals, groups, and corresponding organisation, which together support knowledge flow - and subsequent decisions and implementation. Organisational learning, as suggested by Huber (1991), occurs through transferring knowledge from the individual to the collective level. This study aims at bring additional insights on these SMEs' situated learning (Harrison and Leitch, 2005), likely dependent on contextual critical events (Cope, 2003). Specifically, the study analyses their organisational learning, with particular focus on entrepreneurial learning, in facing contextual events (Cope, 2003) and the ensuing capacity in absorbing knowledge throughout the organisation (Cohen & Levinthal, 1990). It is also examined the outcome of such learning processes in terms of combination of knowledge resources and capabilities that can constitute competitive advantages (Hitt et al., 2001). The next section deals with the knowledge acquisition.

2.5. Learning modes

The evidence and theory suggests that effective knowledge acquisition in GOFs involves individuals (managers and other related key actors) and processes that can be described in terms of an interplay between different modes of learning. Building on Zahra et al., (2006) and Huber (1991), we suggested a classification, which aims to define discrete learning modes such as learning 'by doing', networking, trial and error, improvisation, imitation, 'grafting' and searching.

The different learning modes identified by Huber (1991) are centred on the following categories of: individuals' own experience; others' experience; organisational memory; formal or informal learning; internal routines; externally focused and novel; planned, or unintentional learning. GOFs, with their high learning intensities, can share most of these learning modes as they have been shown to be highly effective at environmental scanning and engaging with external knowledge providers with whom they forge strong relationships, through a more interactive learning mode (Zhang et al., 2006).

Particularly, by learning through networking, as Taylor and Pandza (2003) propose, firms gain rapid access to others' new knowledge and, without having to repeat the experiences of their 'trusted contacts', enact relationships with key external actors and knowledge sources.

These firms can also learn through imitating others, following actions already taken by the majority of organisations as they are perceived as already legitimized, or their success is taken for granted. Imitation as proposed by DiMaggio and Powell (1983) is a constraining process (institutional isomorphic pressure) that compelled organizations to resemble others in facing the same context. It can assume the form of coercive isomorphism, resulting from pressures exerted on organisations by other organizations on which they are dependent (e.g. regulation); mimetic isomorphism, in which organizations may model themselves on other organizations in order to face uncertainty; and normative isomorphism that stems primarily from the norms and practices associated with particular professions and occupations. Indeed, according to Abdelgawad et al., (2013), within a business ecosystem of increasing competition, involving multiple players that differ in strategies, capabilities, and resources, a strong performance draws the attention and response of other players and company leaders to either imitate or otherwise take advantage of radical innovations.

Although some studies have found imitation to be positively related with growth (e.g. Autio et al., 2000), there is evidence to support that GOFs gain their advantage through a commitment to more significant innovation and the creation of new markets (Liao et al., 2003). Huber (1991) also found that firms can also learn through acquisition, or 'grafting', whereby they acquire another business or new expertise in order to obtain 'second hand' access to its knowledge base, resources, and capabilities. Delmar et al., (2003), on the other hand, suggest that the organic growth of the individual enterprise is more likely to represent genuine '*organic*' job creation than is growth by acquisition, where existing jobs are simply transferred from one firm to another. According to Huber (1991) firms scan the external environment, by learning through searching, focusing the research on a segment of internal or external environment. Zahra et al., (2006), posit that by trial and error, explorative learning actions take enterprises beyond their normal routines and 'comfort zone' and thus are particularly important is supporting significant future actions and more novel innovations.

In the case, growth-oriented SMEs, as Sadler-Smith et al., (2001) suggest, tend to adopt an active learning posture while retaining a willingness to review existing routines through constant searching. Conversely, 'learning by doing' tends to be firm specific, time consuming, and relies on the firm's tacit and idiosyncratic knowledge. According to Zahra et al., (2006), this incremental and adaptive learning mode seems to be adopted more often by more reactive and less innovative SMEs.

Improvisation is referred by Moorman and Miner, (1998) and Zahra et al (2006) as a common learning mode in SMEs, which can occur whenever real time, unplanned experience influences action as it occurs. The literature identify it as a distinct type of real-time, short-term learning that principally emerge in fast-moving competitive settings and in areas such as new product development, in which experience and related change happen all at once (Moorman and Miner, 1998). Specifically, the creation and execution of a new product can occur simultaneously in order to face unexpected events or surprises in bringing a product to market. Notably, the improvised activities often occur outside the organized routines and planning as a form of short-term learning. In Moorman and Miner's words "*The focus of the activity is to get the problem solved rapidly or take advantage of specific opportunity*" (Moorman and Miner, 1998, p.322). As a result, the improviser cannot therefore realize the consequences of the improvised production while executing it, in contrast to what happens for example in trial-and-error or experimental learning. The theoretical inference is that GOFs often are responsive to the external environment due to their proactive strategy with ensuing integration of knowledge (Liao et al., 2003), suggesting the presence of improvisation.

Furthermore, while learning by improvisation, the process can be moderated by well embedded routines, information and knowledge accumulated (and sometimes lost) by an organisation during the course of its existence that Huber (1991) identified as organisational memory. The function of organisational memory is often seen as dependent on storage and retrieval systems, but can also be shaped by a social process whereby key organisational actors influence how this relevant 'memory' is identified, stored and embedded in ongoing practices/routines. Organisational memory can also be an obstacle to unlearning old and unnecessary capabilities, particularly given that firms tend to acquire closely-related knowledge, in pursuit of immediate efficiency-related considerations.

These different learning modes are described separately only for explanation. Because learning depends on the way individuals learn, the different learning modes may as well be differently combined over time (Colbert, 2005). For example, Moorman and Miner (1998) contend that the rapid improvisation of new products to face surprises (e.g. declining market) can coexist with well-established planning. Likewise, high learning intensity, recognised as a key characteristic of GOFs, is unlikely to be maintained in the long term, given the limited resources and capabilities of SMEs to continuously absorb large amounts of new knowledge in the long term (Zhang et al., 2006).

These learning processes can present variable degree of exploratory level. Indeed, Argyris and Schon (1978) have identified three main learning levels: *single loop*, or adaptive learning, occurs within the established learning frame of the organisation, focused on exploiting existent products/services, processes and resources for maximum short term advantage; *double loop* learning, or generative learning, occurs when the established learning frame of an organisation is subject to more radical change to address new challenges; deuteron learning implies "learning how to better learn" at the organisational level. High exploratory learning is also unlikely to be maintained over time because of the need to continuously implement and institutionalize knowledge in SMEs (Zhang et al., 2006). This also indicates the need for a longitudinal approach to investigation in situated, unique social and business contexts where decisions on critical events faced by entrepreneurs and their teams play a key role. The next section will deal with the concept of entrepreneurial learning.

2.6. Entrepreneurial learning

The literature on entrepreneurial learning places the owner-manager at the centre of GOFs' learning processes. Their interpretation of environmental events and subsequent strategic choices strongly influence organisational structures, learning opportunities (Child, 1997), therefore prioritising their individual learning experiences in a social context (Harrison and Leitch, 2005). Zhang et al., (2006) similarly posit that learning in SMEs can only be understood in terms of the organisational context and the role of the owner-manager in embedding entrepreneurial learning within their firm. This assumption is paramount to GOFs as they present characteristics of highly entrepreneurial businesses, being strongly market oriented and with high levels of novelty in terms of their products, services and business models (Birdthistle et al.,

2009). Therefore, Abdelgawad et al.'s (2013) argue that an integrated entrepreneurial capability throughout the organization is positively related to the creation of new opportunity realization paths, thereby increasing organizational novelty.

Research on entrepreneurial learning has focused on individual experiential learning processes (e.g. Deakins and Freel, 1998); learning in new venture creation (Erikson, 2003); learning 'by doing' (Gibb, 1997; Boyd and Vozikis, 1994); learning in SME growth and centred on critical events (e.g. Cope, 2003); learning by development of learning capabilities (Chaston et al., 1999; Rae and Carswell, 2000, 2001; Rae, 2000, 2003, 2004, 2006); and learning by networking (Taylor and Pandza, 2003; Taylor and Thorpe, 2004). Minniti and Bygrave (2001) contend that entrepreneurial learning relies on the external industry knowledge that entrepreneurs successfully gathered in order to update their subjective stock of knowledge. Indeed, learning theories recognize that decisions to change depend on managers' experience (Penrose, 1959; Fiol and Lyles, 1985; Child, 1997) and context.

With few exceptions, current entrepreneurial learning theories resemble the experiential learning model of Kolb (1984) in that they tend to be focused on the internal and individual learning cycle of the entrepreneur. Kolb's experiential learning model considers learning as a process of relearning. It is a constructivist theory of learning whereby social knowledge is created and recreated in the learner, in a cycle of experience, reflective observation, abstract conceptualisation of the new knowledge, and active experimentation (Kolb, 1984). Building on this, knowledge-based organisational theory (e.g. Grant, 1996) considers personal and business experiences as individual knowledge resources and capabilities with the entrepreneur learner at the centre of the model. Entrepreneurial learning primarily involves interaction between the individual and his/her context, with little consideration given to the individual, the wider organisation, and the social context (Harrison and Leitch, 2005).

The various theories on entrepreneurial learning present a number of differences in their approaches, with some studies being more individual oriented (e.g. Deakins and Freel, 1998), others that are more context oriented (e.g. Fontes and Combs, 2001) and still others that aim to integrate both dimensions (Abdelgawad et al., 2013). Some studies also focus on self-reinforcing learning cycles and 'sense making' processes (Ravasci and Turati, 2005) while others focus on individual self-efficacy (i.e. individual

confidence levels and self-belief in responding to challenges) enhanced with learning by experience, (Boyd and Vozikis, 1994). Because of resources scarcity, the ambiguity of opportunities and incomplete information, entrepreneurs often engage in an exploitation cycle also relying heavily on previous information (Minniti and Bygrave, 2001).

Politis (2005) emphasizes the role of experience in entrepreneurial learning through reference to a number of theories of experimental learning, positing that learning is a process, and creation of knowledge is its outcome. An important element in Politis' framework is the embracing of a dynamic perspective, which draws attention to the intermediate processes through which experiences are transformed into knowledge. The entrepreneur's background is positively related to the development of entrepreneurial knowledge, and an entrepreneur's predominant mode of transforming experience into knowledge moderates the relationship between his or her career experience and entrepreneurial knowledge. These factors increase the effectiveness in taking advantage of opportunities (Politis, 2005).

A number of other studies give greater emphasis to context, whereby critical events are decisive in triggering absorption and assimilation of new knowledge. Cope (2003) emphasises the dynamic and interrelated social process stimulated by critical events that supports entrepreneurial learning. Cope (2003) argues that context and history shape entrepreneurial knowledge and capabilities that evolve through a process of experimentation and reflection, considered as an emergent process of becoming, in which people develop the ability to act differently, through knowing, doing, and understanding. Thus exploratory, discontinuous learning is emphasised, rather than more exploitative, *single loop* learning, i.e. doing 'better things' creatively, rather than simply 'doing things better' by making small scale improvements within existing boundaries. Thus Abdelgawad et al.'s (2013) argue that the entrepreneurs redeploy accessible resources to create and/or exploit new opportunities to make profits, and that redeployment is, by definition, a dynamic capability.

Similarly, other studies support that entrepreneurial learning can be considered to be an interactive 'sense making' process involving different contexts, network relationships, and internal experience (Rae and Carswell, 2000, 2001; Rae, 2000, 2003, 2004, 2006). This conceptualization echoes the findings of the study by BERR (2008), reflecting the general conclusion that growth-oriented entrepreneurs are generally more skilled and

experienced than other entrepreneurs, as well as being more motivated (Birdthistle et al., 2009). GOFs also rely significantly on the sort of supportive contexts that are more often found in industries and regions that are more dynamic (Etienne et al., 2008).

Of particular relevance to this study, Fontes and Combs (1996; 2001) have examined experiential learning in Portuguese high tech companies, finding that entrepreneurial learning was a process of resource acquisition involving several actors, establishing between themselves and the environment a diversity of relationships. Consequently, Fontes and Combs (2001) argue that the actors' location, characteristics and their relationships shape the entrepreneurial learning, by limiting the available resources, opportunities and the way they are identified and exploited.

Several studies recognize the role of events in stimulating learning (e.g. Fiol and Lyles, 1985; Cope, 2003) and driving the firm to higher levels of learning, but, according to Harrison and Leitch (2005), do not fully explain how the entrepreneur shares his or her knowledge within SMEs and their contexts.

The understanding of such interaction between learning and the entrepreneurial process remains unclear as entrepreneurs either built teams around them or are part of an organisation. The literature on processes of organisational learning is further explored in the next section.

2.7. Organisational learning

Researchers on entrepreneurial learning posit that, because of limited resources, learning in smaller firms is remarkably different to that in large organisations (e.g. Cope, 2003; Deakins and Freel, 1998). The SME category covers a spectrum of businesses ranging from individual entrepreneurs to organisations with as many as 249 employees and therefore, learning processes in SMEs are likely to be highly varied and characterised by both entrepreneurial learning, focused on the owner-manager, and organisational learning also, a wider collective process involving other managers and staff.

On average SMEs are small and young and tend to be more flexible and with less formalised structures and procedures than older firms, which can make them more receptive to new learning (Zahra et al., 2006) and with a greater ability to adapt and

innovate (Liao et al., 2003). How and what firms learn and how they change depends partly upon the length of their history and their context (Zahra at al. 2006) with the search for new knowledge and its application being dependent on the previous knowledge base (Cohen and Levinthal, 1991).

It is difficult to generalise about learning processes in SMEs, due to their idiosyncrasies and heterogeneity, their varied resources and capabilities. New insights are needed into how these interact with their contexts, either at the group, intra-organisational, organisational or inter-organisational levels. This is particularly so, given that evidence suggests that SMEs, on average and in the European context, are mostly founded and managed by entrepreneurial teams rather than isolated individuals (BERR, 2008). Moreover, studies indicate that GOFs owner-managers tend to adopt a more open management style, encouraging employee participation and prioritising the development of effective learning networks with external actors. In other words, GOFs owner-managers have a greater willingness to share knowledge with their employees, with greater focus on both intra organisational learning and external networking (Zhang et al., 2006).

Although the process starts with individual learning, organisational learning demands interaction between different actors, rather than the simple scenario of 'top down' decision goals (Vickers and CordeyHayes, 1999). The organisational learning process is therefore a function of learning modes, levels and scope. For example, learning by interacting often involves owner-managers (or other key organisational actors), combining and exploring, at high level, different knowledge from others, as a result of a larger inter-organisational scope. It is therefore more complex than individual learning.

Relatively little research in organisational learning has been applied to entrepreneurial learning in small businesses, and the entrepreneurial context has received little attention in the innovation and learning literature (Wynarczyk et al., 2013). The literature on organisational learning has taken on two perspectives: one cognitive (e.g. Cyert and March, 1963), based on the psychology of individual learning; and a social perspective, based on social and relational learning (e.g. Brown and Duguid, 1991).

The first perspective sees the individual learning process as the foundation for learning in organisations (Cyert and March, 1963; Hedberg, 1981). This approach assumes that

organisations are able to learn, given that they have capacities that are similar to those of individuals. Specifically, like an individual, the organisation learns if it acquires knowledge, recognised as potentially useful (Huber, 1991). However, cognitive changes alone, like in individuals, may not lead to an observable behavioural outcome and organisational effectiveness in terms of new capabilities (Argyris and Schon 1978). As with individuals, newly acquired knowledge, although changing understandings, may not necessarily lead to new behaviours (Huber, 1991).

The second perspective understands organisational learning as different from the acquisition of discrete pieces of knowledge. Lave and Wenger (1991) attempted to categorise it as the development of situated identities based on participation in a community of practice. Organisational learning as social development involves therefore the development of a common understanding, starting from a specific social setting and people's social relationships and backgrounds.

The two approaches are not discrete. Organisational learning deals both with cognitive and social components and sees knowledge as flowing, from individual to social group, from identifying information to integrating it in a specific context. Intuiting and interpreting take place within the individual domain; interpreting and institutionalizing occur at group, organisation, and inter-organisational levels. Organisational learning therefore starts at the individual level, with knowledge acquisition and flows throughout the organisation by knowledge diffusion, and integration (e.g. Cohen and Levinthal, 1990). It thereby involves individuals, groups and organisations through different learning modes, levels, and scope (Zhang et al., 2006).

The conceptualization of such integration has been presented under different forms: learning through developed consensus on interpretations around shared knowledge (Fiol, 1994); a process of identifying erroneous and correct activities (Argyris and Schon, 1978); a process of continual integration and processing of individual knowledge at higher units in the organisation by knowledge acquisition, sharing and distribution, interpretation and storage in organisational memory (Huber, 1991).

Crossan et al., (1999) consider four interacting phases within the learning system, which constitute of intuiting, interpreting, integrating, and institutionalizing by a feed-forward process of explorative behaviour and a feed-back exploitative behaviour. It is about a

process of knowledge acquisition and subsequent interpretation and embedding in organisational systems. Such a process has been conceptualized differently: perception, interpretation, and reaction, associated with unlearning of old learning (Hedberg, 1981); detecting and correcting knowledge related errors by carrying out existing policies ("single loop learning") or questioning underlying policies ("double loop learning"), or questioning the establishment ("deutero-learning") (Argyris and Schön, 1978); or knowledge acquisition, distribution, interpretation, and memorization (Huber, 1991).

Finally, some other theories seek to integrate organisational constructs and entrepreneurial learning and are mostly centred on entrepreneurial opportunity enactment (e.g. social construction of opportunity). Dutta and Crossan (2005) propose the adoption of an organisational learning model that distinguishes the processes of Intuiting, Interpreting, Integrating, and Institutionalizing (4Is) to recognize the nature of opportunities unfolding as entrepreneurs engage with them.

Lumpkin and Lichtenstein (2005) identify three approaches to organisational learning: behavioural in goals oriented firms; cognitive, in which individual cognitive maps are translated into organisational cognitive schemes; and action learning in aligning theory and theory in use; the more entrepreneurially firms engage in cognitive, behavioural and action learning processes, the more effective they will be (Lumpkin and Lichtenstein, 2005).

To Corbett (2005), learning is a social process created by transforming the experience. It relies on Kolb's (1984) entrepreneurial learning theory. Part of the variance in the opportunity recognition behaviour is because of the opportunity identification and exploitation are based on learning asymmetries, by which individuals acquire and transform experiences in ways that can be more or less explorative or exploitative (Corbett, 2005) – a key tension to be further examined in this study.

Entrepreneurial capability

Abdelgawad et al., (2013) contend that Entrepreneurial Capability (EC) refers to a firm's overall capacity: to sense or envision business opportunities, within as well as beyond the confines of an industry; to select by comprehending and choosing which ideas and insights to focus on and pursue given a firm's strategic priorities and resources; to shape by transforming and connecting internal and external elements for

opportunity probing and realization; and to synchronise by orchestrating the temporal and spatial correspondence of internal and external resources, capabilities, and activities to reach markets for the exploration (recognition, discovery, and creation) and exploitation of opportunities. EC is, therefore, characterized by the interplay of corporate entrepreneurs' (managers' and employees') abilities to envision new courses of action, and by their success in assembling resources in pursuit of them. It involves judgments and actions from an array of entrepreneurs with different roles and contributions throughout the process of reshaping and using a firm's capability portfolio in accordance with their mental models. Hence, it places the emphasis on the owner-managers' role in the identification, evaluation, realization, and creation of opportunities.

Absorptive capacity

Closely related to the concept of organisational learning is the notion of absorptive capacity that is the ability of an organisation to gather information from the environment and apply it. Cohen and Levinthal (1991) refer to a firm's absorptive capacity as a learning process in which the firm's R&D both induces new knowledge and augments the capacity of exploiting and absorbing knowledge. This capacity depends on the firm's previous knowledge base and is crucial to the firm's innovation capability. Absorptive capacity is therefore the *"ability to recognise the value of new external information, assimilate it, and apply it to commercial ends"* (Cohen and Levinthal, 1990, p.128). Zahra and George (2002) disaggregate those phases into a firm's potential absorptive capacity (acquisition and assimilation of knowledge) and realized absorptive capacity (transformation and exploitation of knowledge).

The knowledge acquisition stage has to do with the firm's interface with the external environment which is to say its learning capability to identify opportunities and acquire knowledge already created outside (Cohen and Levinthal, 1990; Zahra and George, 2002). Such a capacity is a function of prior related accumulated knowledge and is therefore path dependent (Cohen and Levinthal, 1990).

The knowledge assimilation stage includes routines that allow the firm to process the knowledge provided by external sources. It refers to the capability to transfer knowledge between departments and individuals (Cohen and Levinthal, 1990). This

capability of internal innovation should be prioritized against buying absorptive capacity (Cohen and Levinthal, 1990).

The knowledge exploitation stage underscores the application of knowledge (Cohen and Levinthal, 1990), because only when absorptive capacity is realized may competitive advantage be assured (Zahra and George, 2002). It implies the capability to combine new knowledge with different applications (Zahra and George, 2002). Firms refine existing competencies or create new ones to, exploit knowledge through systematic routines over time (Zahra and George, 2002). The learning outcomes include new products, for example. The process discussed above allows the firm to combine both internal and external knowledge through both an exploitative and explorative process (March, 1991).

Research on absorptive capacity has been the subject off some criticism. Lane et al., (2006) claim that, firstly, the focus on research and development (R&D) and exploitation learning disregards the importance of business knowledge and also more explorative learning. Secondly, it prioritises the structural aspects of an organisation's processes, disregarding the role of individuals. The acquisition of new knowledge is mediated by individual gatekeepers with diverse knowledge (e.g. Seaton and Cordey-Hayes, 1993). The diversity of internal perspectives is crucial because excessive homogeneity of internal views can lead to resistance to external ideas (Cohen and Levinthal, 1990). Growth-oriented firms involve other key people and delegates throughout the organisations, which imply a greater heterogeneity in internal views (Birdthistle et al., 2009).

Nevertheless, to absorb new ideas individuals must be receptive to them. The more individuals and groups within the firms are receptive to new ideas, the greater the chances of efficient absorption of knowledge from outside (Morales et al., 2007). The concept of receptivity (Seaton and Cordey-Hayes, 1993) is closely related to absorptive capacity and consequently to organisational learning. Receptivity comprises the organisation's overall ability to be aware of, to identify and take advantage of knowledge, in the way the user sees it within his "world".

Absorptive capacity is about acquiring and disseminating knowledge in a certain area, whereas organisational learning deals with transforming individual learning into

collective learning. According to Lane et al., (2006), such a recursive relationship has been under examined, namely in how different learning processes implicate causality in firms' absorptive capacity and non-R&D content and contexts. On the other hand, Birdthistle et al., (2009) alleged that it is likely that growth-oriented SMEs experience intense organisational learning, they are generally most innovative, and they have strong links with other key actors external to the organisation.

The field of learning in SMEs is still therefore fragmented and has not fully explained the interplay between individual experiential learning, organisational learning, and contextual dimensions. It is, therefore, of particular interest to further examine how diverse events enter into the organisational learning equation in growth-oriented SMEs and their influence on firms' absorptive capacities and different entrepreneurial capabilities (Cohen and Levinthal, 1990; Zahra and George, 2002; Abdelgawad et al., 2013), including the extent to which the ability to learn leads to more learning and to more absorptive capacity (Bosch et al., 1999).

2.8. Growth and the learning process: summary

From the insights obtained from the literature review, one can conclude that a firm's growth and learning ability are two closely related concepts. The growth and success partly depend on the learning processes to deal with events and intra-firm learning processes are influential in coping with situated critical events (Penrose, 1959). According to Wynarczyk et al., (2013), the research focus should therefore shift attention from abstract evolutionary stages (e.g. Greiner, 1972) to different modes of growth and related learning events within an innovation system. The emphasis should therefore shift form the differences in '*what growth*' to the qualitative differences in terms of '*how*' firms attain such growth (McKelvie and Wiklund, 2010).

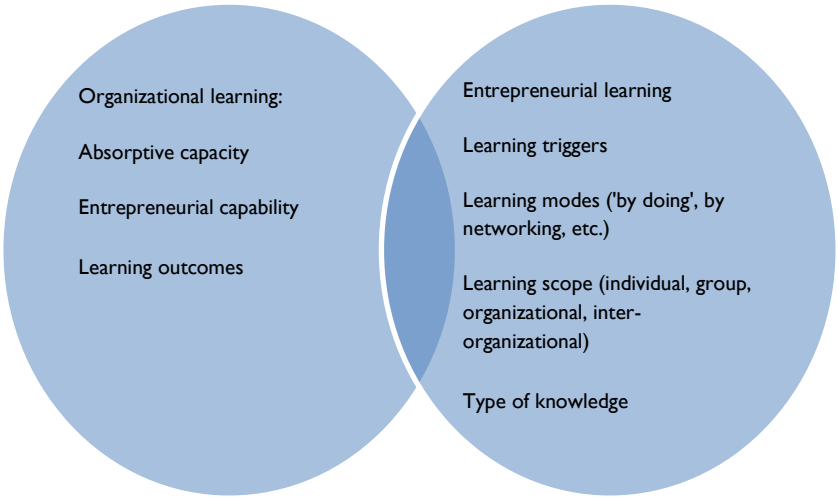
According to Liao et al., (2003), there is a consensus on GOFs' main characteristics such as that they display high economic value, show proactive organisational responsiveness and exhibit dense learning interactions. However, there is little research on their learning and growth processes as their learning behaviour is likely to vary according to the context upon which they rely. This study focuses on GOFs, with particular reference to the contexts on which they are said to be highly dependent, focusing on the key role of the entrepreneur/owner-manager (or entrepreneurial team).

With respect to the learning mechanisms of SMEs, perspectives from organisational learning could offer insights. There exists a vast corpus of literature regarding organisational learning, but only a few strands are of use here to analyse growth-oriented SMEs. The organisational knowledge literature deals with knowledge flow within organisations and resembles the resource based view in the literature (e.g. Grant, 1996). Although there is a concern about knowledge, sources and outcomes of organisational learning, the view is taken here that it is more useful to focus on the process, and causal inferences, and the interdependencies amongst factors.

This study focuses therefore on GOFs through a social perspective that takes into account their interplay with contextual events. We concentrate on SMEs, which are likely to show greater learning intensity, centred on the decisions of their owner-manager, whose entrepreneurial learning is given a special emphasis (Figure 2.1).

We therefore attempt to integrate perspectives on entrepreneurial and organisational learning to examine the learning processes of growth-oriented SMEs, in particular in relation to their processes of knowledge absorption over time.

Figure 2.1 Learning processes of growth-oriented SMEs



As growth-oriented SMEs are highly influenced by the context in which they operate, the next chapter sets out the conceptual framework to be employed in this study and considers in detail the specific Portuguese and sectoral context relevant to this research.

3. Chapter Three: Context and firm learning

3.1. Introduction

As discussed in the previous chapter, situated learning theories suggest that learning occurs mostly within the social relationships in which an individual or a group is engaged (Wenger, 1998). Organisational context is also known to have a significant influence on the available opportunities for owner-managers and also conditions the modes by which they learn (Zhang et al., 2006). The entrepreneurial learning literature sees the entrepreneur's life and behaviour as being motivated by the wider context of business growth and personal development (e.g. Cope, 2003). So, the more the entrepreneur searches and shares knowledge within the firm, the better is the knowledge dissemination and adaptation to the environment (Liao et al 2003) or, the higher the organizational embeddedness of EC, the greater the novelty (e.g. radical changes) a firm will generate (Abdelgawad et al., 2013). Similarly, learning in growth-oriented SMEs can only be understood in terms of their wider social, industrial and institutional context (Macpherson and Holt, 2007).

This chapter examines the importance of context to firms' learning, drawing upon recent theories of interactive learning and the concept of 'open innovation' (e.g. Oakey, 2013) to develop a conceptual framework appropriate to this study. The learning literature focuses upon learning as a collective process, and the previous review of this literature indicates that learning between firms, institutions and other actors is one of the key factors influencing their learning capacity (e.g. Wynarczyk et al., 2013). In order to understand how interactive learning takes place within a given spatial context, understanding of the particular national, regional and sectoral contexts in which firms are embedded is required.

In this chapter we first examine the role of context in firm's learning processes, with particular consideration of this in relation to less favoured and intermediate regional contexts. From this we develop a conceptual framework to inform the study. The chapter then considers the elements of the Portuguese national and sectoral context which are pertinent to understanding the learning processes of growth-oriented SMEs analysed in the rest of this study.

3.2. Learning in context

3.2.1. Interactive learning and spatial context

Learning is an interactive process and although firms are paramount in accumulating knowledge, other actors and institutions – e.g. sources of knowledge and technical knowledge such as research centres, universities, suppliers, customers - perform an extremely influential role, as well. Nelson and Winter (1982) point out that firms accumulate knowledge directly from their environment, for instance through recruiting new staff. Lundvall (1988) further argues that countless interactions take place both within the firm learning process and beyond firm boundaries.

The concept of interactive learning has been applied both to the national and regional levels (e.g. Wynarczyk, 2013) in an attempt to explain the extent to which regional economic agents manage to learn both internally at their own initiative and through collective learning. Interactive learning and regional development theory developed initially in the 1950s (Boekema and Rutten, 2007), as theorists realised that innovation could be a vehicle to develop both firms and regions and that spatial economic concentration allowed firms to benefit from 'external economies'.

Perroux (1955) was the first to incorporate the concept of innovation in regional development theory. Perroux argued that development in capitalist economies was dynamic, focused around 'growth poles' and 'propulsive industries' which benefit from local external economies and also prompt innovation, dragging forward other less innovative industries. Myrdal (1957) introduced the need for governance to avoid the unbalancing effects of market mechanisms, identifying that if unregulated, markets would cumulatively attract additional capital, trade and labour at the expense of other less developed regions. Consequently, in the end, the state would be required to act as a powerful 'top down' referee. Hirschman (1970) similarly demonstrated that regional development occurs irregularly across regions, giving rise to inequalities between core and less favoured areas, in which the state should actively create complementary external economies.

In the 1980s, Piore and Sabel, (1984) reintroduced the concept of the industrial district, emphasizing how proximity binds regional development and institutions, with economic success being owed to localized regional interactions involving small firms within the

region. The resulting concept of new industrial spaces demonstrated how regional agglomeration was rooted in lower transaction costs (e.g. Storper and Christopherson, 1987; Scott, 1988) and that the presence of common economic characteristics and related networks are conducive to innovation. This role of networking for collective learning was similarly emphasised through the concept of the 'innovation milieu' (e.g. Aydalot and Keeble, 1988; Camagni, 1991). More recently, work influenced by Chesbrough's (2003) concept of 'open innovation' has re-focused on how firms can increase their absorptive capacity, innovation and market growth by attaining externally developed technology and interacting with a wide range of external actors and networks (e.g. customers, competitors, suppliers and research institutes). Dahlander and Gann (2010) suggest that 'openness' to innovation has to some extent always existed, based on outflows and inflows of ideas and resources, as in the case of diverse types of partnerships. The question is, in their words, "*Why are some firms profiting more than others from 'openness'*?" (Dahlander and Gann, 2010, p.706).

Interactive learning theory draws from these different literatures to highlight the process and spatial dimension of learning, the way the process of learning can be organized, and the tangible and intangible 'infrastructures' that support learning. These concepts overlap, particularly given that clusters, networks and institutions of innovation may operate over varying scales (e.g. country, region, world), although particular importance has been attached to interactive learning supported by regional institutions of innovation (Morgan, 1997; Storper, 1995; Boekema and Rutten, 2007). The notion of interactive learning contends that actors are strongly and flexibly connected one to another and are open both to intra-regional and interregional learning processes with different knowledge (e.g. Boekema and Rutten, 2007). Firms should be studied within the idiosyncratic context of their real social interrelationships because learning is a social process whereby contextual factors play a role (e.g. Oakey, 2013). In particular, social interaction in SMEs plays a crucial role in the knowledge symmetry between firms and context (Liao et al., 2001). For instance, external networks vary within different sectors, are related to external resources and could, therefore, influence the improvement of institutional knowledge in a given firm (Fontes, 2003).

3.2.2. Firm learning in less favoured and intermediate regions

The concept of interactive learning is primarily informed by the experiences of favoured regions, mainly in Europe and North America that are well endowed with sophisticated learning infrastructures such as good laboratory facilities, incubator centres or venture capital. Although the interactive learning concept has been extensively studied in developed contexts, few studies have focused on 'less favoured' and intermediate regions (Boekema and Rutten, 2007).

Rosenfeld, (2002) describes the characteristics of a less favoured region as follows: weak infrastructure; lack of access to capital, technology, and innovation; a cultural tendency towards regional insularity and isolationism; low educational levels and low skilled work force; and a hierarchical industry structure. Landabaso (1997) argues that less favoured regions in general lack the institutional frameworks needed to support learning, innovation and growth. Here there is a limited capacity for cooperation and coordination among private firms and other institutional actors (e.g. Universities), and public institutions and agencies are often inefficient. Other development contexts, such as the case of Portugal, display many of the characteristics of 'less favoured' regions alongside elements of the more advanced learning environments associated with 'favoured' regions. This has led some authors to classify Portugal as an 'intermediate' or peripheral developing country (e.g. Fontes, 2007).

SMEs in less favoured regions, with few information and knowledge sources, may require particular support in technology-related areas or expertise to cope with contextual constraints. SMEs operating in less favoured and intermediate regions often constitute the majority of firms, with small size (often micro) family owned enterprises being particularly dominant, often concentrated in traditional industries and with a limited ability to respond to new competitive pressures. These SMEs do not have in general the necessary resources to innovate (e.g. managerial capabilities) and often demonstrate a lack of absorptive capacity with regard to external knowledge. A lack of effective institutional support, including from regional knowledge providers (e.g. research and technology transfer centres), is often decisive in trapping firms into low or no-growth paths (Landabaso, 1997).

In short, less favoured regions are characterised by a number of learning shortcomings: little regional receptive capacity; poor learning infrastructure; less developed financial systems with little seed capital and highest interest rates; few knowledge intermediaries to distribute technology; little cooperation among public and private actors; closed markets with little knowledge of supply and demand; difficulties in accessing external know-how; and low levels of assistance for innovation to local SMEs (Landabaso et al., 1999)[5]. Therefore there is a need to analyse in greater detail how those GOFs found in less favoured or intermediate regions are able to overcome their comparative disadvantages with respect to innovation capacities, in order to better understand the learning processes involved.

3.2.3. Contextual dimensions of learning and innovation

To inform understanding of the learning process of SMEs, there is a need for an understanding of context in terms of economic, institutional, industry and market characteristics and their spatial embeddedness across local, regional, national, and supranational scales. Complementing learning theory (Zhang et al., 2006; Cohen and Levinthal, 1990) with insights from regional perspectives (Wynarczyk et al., 2013) provides a basis to better understand how growth-oriented SMEs learn within a wider regional and industry innovation context (Macpherson and Holt, 2007).

These contextual dimensions to learning and innovation are depicted in Figure 3.1. Here the organisational and entrepreneurial learning of growth-oriented SMEs is related to the wider micro and macro contexts in which they operate. Environmental characteristics can lead an SME to realise the shortcomings of its existing knowledge base, stimulating them to learn. Turbulent and unpredictable environments pose a particular challenge, prompting the need to learn (March, 1991), to absorb and disseminate external knowledge (absorptive capacity) and shape resources to opportunities (entrepreneurial capability), with owner-managers performing a central learning role as the main decision makers, and knowledge gatekeepers (Child, 1997).

[5] Limburg (Netherlands), and Lorraine (France) are identified by Boekema and Rutten (2007) as good examples of less favoured regions.

Figure 3.1 Contextual dimensions of learning and innovation

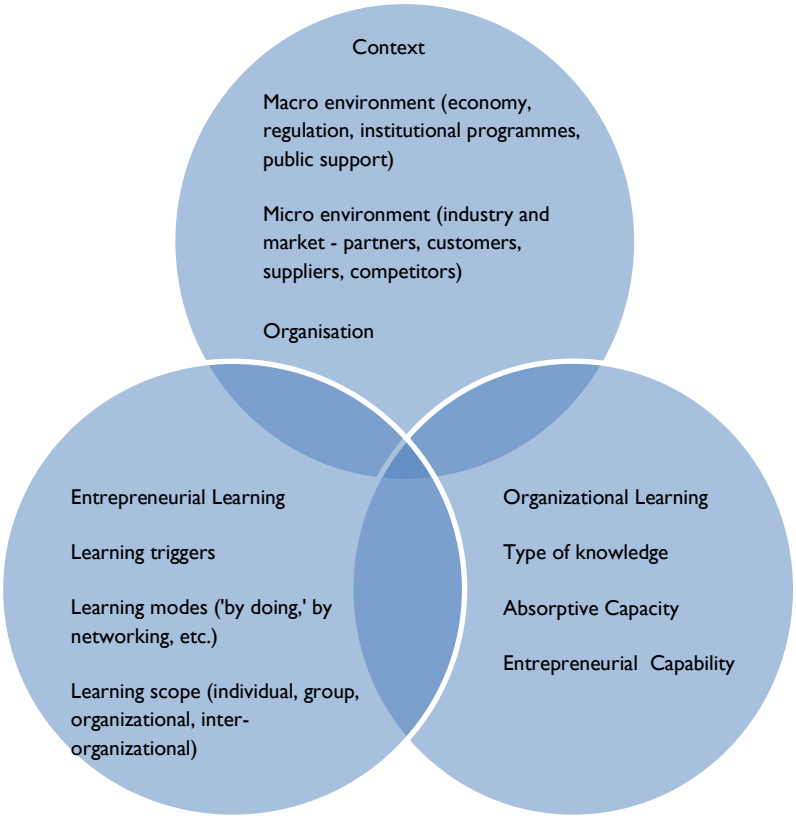
3.3. Conceptual framework

The conceptual framework developed for this study highlights the combined role of context and entrepreneurial and organisational learning in the learning process of growth-oriented SMEs, as well as incorporating notions of absorptive capacity and entrepreneurial capability (see Figure 3.2). Although context and intra firm dimensions seem to be intertwined in an idiosyncratic way (e.g. Macpherson et al., 2007), the majority of existing studies do not seek to combine these dimensions, to consider how these different concepts interplay in practice.

The purpose of such a conceptual framework is to provide a visual or written product that 'explains, either graphically or in narrative form, the objects of study – the key actors, concepts, or variables – and the presumed relationship among them' (Miles and Huberman, 1994, p. 18). An inclusive framework is required here as the study of entrepreneurship can be characterized as fragmented across a broad research field (Harrison and Leitch, 2005). The conceptual framework presented attempts to build a model appropriate to the target of the study, namely to explain *to what extent the*

entrepreneurial and organisational learning processes of growth-oriented SMEs are influenced by distinct geographic and industry contexts. It is considered as a tentative and incomplete theory, constructed but yet to be confirmed by empirical investigation (Maxwell, 2005).

Figure 3.2 Research framework



The proposed model integrates the importance of context, conceived in terms of organisations, and the micro and macro environments as discussed above, with the key concepts that emerged from the review of the existing theoretical literature in the previous chapter.

Entrepreneurial learning: is here conceived as individual learning that takes place within a business/social context (Harrison and Leitch, 2005). It is of central important due to the key role played by the entrepreneur, and his or her previous knowledge and experience when responding to opportunities and coping with the constraints faced by the enterprise (e.g. Zhang et al., 2006).

Organisational learning: is the process in which firms respond to different institutional, firm and intra-firm stimuli by absorbing and distributing knowledge

(Cohen and Levinthal, 1990); sensing, selecting, and shaping opportunities, and synchronising their resources in pursuit of these opportunities (Abdelgawad et al., 2013). This exploitation and exploration process of knowledge development and its intervening actors and learning outcomes, is of paramount importance to the understanding of learning processes.

Organizational learning and the use of knowledge in SMEs is dependent on two key elements: individuals (owner-managers), and internal capabilities. Firstly, decision-making relies on the individual managers' judgement, and his/her knowledge can also influence the exploration and exploitation of the learning resources. Secondly, the internal capabilities (e.g. internal relationships), can significantly affect the firm's learning capability.

Here the concepts of ***absorptive capacity*** and ***entrepreneurial capabilities*** play a crucial role. Absorptive capacity is knowledge-centred and strictly focuses on converting external knowledge to internal knowledge exploitation. Entrepreneurial capabilities reside in the firm′s core team, which includes the owner-manager. These entrepreneurial capabilities enable the concurrent recognition, discovery, and creation of opportunities, which extends the boundaries of the firm and influences the convergence of internal and external conditions. This permits a simultaneous reaction to external change (exploitation) and the discovery of opportunities (exploration) (Abdelgawad et al., 2013).

The fact that entrepreneurial capability comprises a portfolio of different capabilities related to opportunity exploration and exploitation, means that it is continuously deployed in different forms and contexts to create avenues for efficient learning (Abdelgawad et al., 2013). This prompts the question: how is this variety of capabilities created and combined, in different contexts, to maintain the effectiveness of entrepreneurial capability?

Studies on absorptive capacity have tended often to neglect non R&D related dimensions, such as the contextual influence of a less favoured or intermediate developing region, characterised by poor infrastructure and support for knowledge transfer (Lane et al., 2006). Such contexts present several constraints to innovation and business growth and fall well-short of the practices associated with more favoured

regions. The case of Portugal for example, presents a constraining economic environment characterised by institutional rigidities and low absorptive capacity yet at the same time shows a growth in knowledge/science indicators and a number of emergent industries (OECD Annual Report 2007). These particularities of the Portuguese context are now considered in further detail in the rest of this chapter.

3.4. The Portuguese context

Intermediate development contexts, such as the case of Portugal, display characteristics of both 'favoured' and 'less favoured' regions (e.g. Fontes, 2007). This distinctiveness makes the country and its heterogeneous regions and industries an attractive field to observe the influence of different learning events on different firms' learning process. In this section we first consider key elements of national level macro environment, before moving on to consider the micro level environment provided by particular sector contexts relevant to the case study firms analysed in chapters five and six.

3.4.1. Economy and institutions

Since achieving Membership of the European Union (EU) in 1986, Portugal has become a more diversified and increasingly service-based economy. Throughout this period successive governments have privatized many state-controlled firms and liberalized key areas of the economy, including the banking, financial and telecommunications sectors (OECD, 2012).

In the second half of the 1990s, the prospect of entry into the single European Currency led to a period of growth and relative affluence in Portugal, with the generation of a large current account deficit. The Economic and Monetary Union (EMU) brought to Portugal exchange rate stability, falling inflation, and falling interest rates that, in turn, lowered the cost of public debt and helped in achieving fiscal targets. For instance, the GDP per capita on a purchasing power parity basis rose from 51% of the EU average in 1985 to 78% in early 2002 (Eurostat, 2012a). However in the 2000s, Portuguese GDP per head fell from just over 80% of the EU 25 average in 1999 to just over 70% in 2007, whilst the unemployment rate increased by 65% from 2002 to 2007, (Eurostat, 2012a). Furthermore, the composition of economic growth became highly dependent on a credit-fuelled boost in domestic demand.

In 2009, the ratings agency Standard and Poor lowered its long-term credit assessment of Portugal to "*negative*" emphasizing the country's structural weaknesses in the economy and weak competitiveness. In 2010, Portugal had called for international financial assistance to address its large current-account deficit through corrective policies. Since then Portugal has experienced a traumatic economic period of sustained high unemployment, low productivity growth, and a huge budget deficit, and has just emerged out of a major international financial assistance programme funded by the EU and IMF.

Portuguese businesses are concentrated largely within old and low growth industries comprising textiles, wood/furniture, food products, beverages and tobacco and the manufacture of basic metals and fabricated metal products (INE, 2012b). Portugal still exhibited in 2012 an economic structure characterized by poorly competitive specialised industrial sectors and smaller pockets of more innovative growth activity. The current general characteristics of Portuguese economy are detailed below in Table 3.1.

Table 3.1 Portuguese economy – key figures

Key economic characteristics	
Gross Domestic Product (GDP)	€185 billion (2012)
GDP per capita	€17,365 (2012 est.)
GDP by industry	Agriculture 2.1%; industry: 23%; services: 74.9% (2012)
Inflation	2.9% (2012)
Labour force	5.54 million (2012 est.)
Labour force by occupation	Agriculture 11,9%; industry: 28,5%; services: 59.8% (2011)
Unemployment	16.9% (As of December 2012)
Main industries	Textiles, clothing, footwear, wood and cork, paper, chemicals, auto-parts manufacturing, base metals, dairy products, wine and other foods, porcelain and ceramics, glassware, technology, telecommunications; ship construction and refurbishment; tourism
External Exports	€45.34 billion (2012)
Export goods	Agricultural products, food products, oil products, chemical products, plastics and rubber, skins and leather, wood and cork, wood pulp and paper, textile materials, clothing, footwear, minerals and mineral products, base metals, machinery and tools, vehicles and other transport material, and optical and precision instruments
Main export partners	Spain 24.8%, Germany 13.6%, France 12.0%, Angola 5.5%, United Kingdom 5.1% (2012)
Imports	€56.01 billion (2012)
Import goods	Agricultural products, food products, oil products, chemical products, plastics and rubber, skins and leather, wood and cork, wood pulp and paper, textile materials, clothing, footwear, minerals and mineral products, base metals, machinery and tools, vehicles and other transport material, and optical and precision instruments, computer accessories and parts, semi-conductors and related devices, household goods, passenger cars new and used, and wine products
Main import partners	Spain 31.6%, Germany 12.4%, France 6.8%, Italy 5.4%, Netherlands 4.4% (2012)
Foreign direct investment (FDI) stock	€35.5 billion (30 November 2012)
Gross external debt	€414 billion (1 January 2012)
Public debt	107.8% of GDP (2011)
Revenues	€94.67 billion
Expenses	€107.4 billion (2012 est.)

Source: INE 2012 (National Statistics)

The current economic crisis has worsened the country's pre-existing structural problems. As a whole, the European economy was undermined and experienced a period of low or negative GDP growth rates. In Portugal this situation severely limited private consumption, the availability of credit for working capital, and possible investment in new businesses, generating few employment opportunities (Eurostat 2012a). Despite these economic difficulties, in economic terms Portugal is still considered a *high income economy*[6], albeit displaying a GDP of only 81% of the EU-27 average (Eurostat, 2012a).

The impact of the economic and financial crisis on SMEs was critical as the Portuguese economy is principally made up of SMEs. In 2011, SMEs represented 99% of total manufacturing firms, accounting for 79% of total employment; as situation which led to growing concern by the government over the prospects of these firms (INE, 2012a). The economic crisis worsened the problems that SMEs faced in general and which had traditionally hindered their innovation and growth processes, such as lack of finance, qualified labour, and poor access to information and advice (Santos, 2000).

Consumption has contracted due to the restrictive fiscal consolidation measures and as long term unemployment has risen due to adverse developments affecting labour-intensive sectors in particular. Demand for Portuguese goods within Europe has also been in decline as other European economies experienced a sharp slowdown, thus pushing Portuguese SMEs to target overseas markets, necessitating additional international business knowledge and expertise. Varum and Rocha (2013) show in their study of employment and Portuguese SMEs during the crisis, that Portuguese SMEs grew very little in size over this time. Thus, during the economic recession, SMEs in impacted sectors reacted not by reducing employment rapidly, as they were already small, but rather by paying low wages and reducing investment.

Portugal has been judged to demonstrate below European average levels of institutional efficiency in areas of governance, legal and financial provision (ICON Group International, 2007). Government policies are complicated by excessive bureaucracy and cronyism within national government departments and local authorities, with local initiatives hampered by overly-centralised decision-making (Cabral, 2007). Some studies estimate a productivity gap of about 30% as organisations endure inefficient

[6] A country with a Gross Domestic Product per capita of €19,800, in 2010 (Eurostat, 2012a).

bureaucracy and labour market imperfections (Cabral, 2007). The current Portuguese legal system is also slow, with cases taking years if not decades, to be resolved, with companies experiencing considerable difficulty, for example, when seeking to recover payments from clients through judicial means.

Official decision-making processes tend to be overly centralized in general, and obtaining government approvals or permits can be time-consuming and costly, for example when applying for Portuguese funding programmes (ICON Group International, 2007). However, protection of property rights is assured, although these consist of a very time consuming process compared to patenting registering abroad. Therefore most companies opt for co-patenting their intellectual property at the international level (ICON Group International, 2007).

More positively, there are established tax credits for Portuguese companies investing abroad and new programs for technology based companies aimed at stimulating public-private partnership and the recruitment of postgraduates. Also, public programs for addressing the SMEs' lack of financial assistance have been reinforced by an export credit insurance scheme that offers financial assistance for costs involved in developing international markets, particularly in Portuguese speaking countries. This includes trade missions, international exhibitions and market research (www.portugalglobal.pt) (Pinho and Martins, 2010).

3.4.2. Portugal's national innovation system

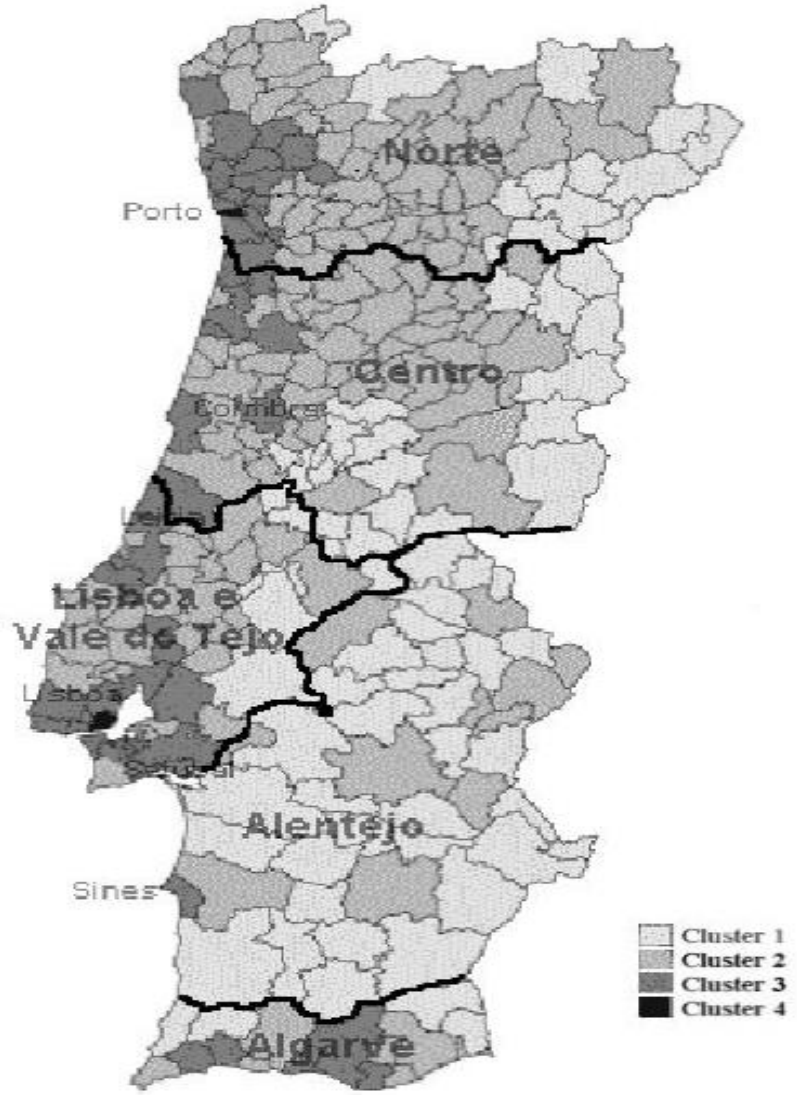
The structural weaknesses evident in Portugal's economy and institutions are reflected in its national innovation system. Indicators for business R&D and innovation fall short of the OECD median and, according to Eurostat (2012b), However, Portugal is considered as a country that is 'catching-up' with respect to innovation. This view is based on performance in relation to a series of indicators:

- Results of the '*Summary innovation Index*' (SII) are below the EU- 27 average, although it has recorded positive average growth on this indicator;
- The share of employment in science and technology is below the EU average, although the country has shown an Annual Average Growth Rate (AAGR) above that of the EU;

- The country holds a Government Budget Appropriations or Outlays on R&D (GBAORD) of 1.4%, well above the EU-27 average of 0.76% (Eurostat, 2012b).

Lisbon is the region with the greatest number of firms with higher technology-related characteristics whilst in terms of introduction of product innovations and commitment to internationalization, firms from the region of Lisbon present similar values to the firms from North and Central regions (Lopes and Teixeira, 2009). However, the country displays internal disparities as some areas, even around cities such as Aveiro, Oporto and Setúbal, demonstrate a weak innovation base whilst others, such as the Centro and Norte regions, show a higher innovation rate within the EU-27 region (Eurostat, 2012b). Other studies (Martins et al., 2006) suggest substantial regional differences in the development of Portuguese regions and municipalities regarding the indicators of competitiveness, cohesion and environmental quality as demonstrated in Figure 3.3 below (INE, 2012b):

Figure 3.3 Regional development of municipalities



In Figure 3.3, cluster 1 - "*less developed rural areas*", is formed by the municipalities' located deep inside the country and stretching to the coastal area of Alentejo; cluster 2 - "*more developed rural areas*", comprises municipalities of intermediate socio-economic level; cluster 3 - "*coastal urban areas*", includes the coastal districts where purchasing power is well above other areas, excluding Lisbon and Oporto, which comprise cluster 4 - "*The two major cities*", which hold the highest degree of development and competitiveness. The figure illustrates the asymmetric nature of the country in terms of overall development and competitiveness with a notable contrast between the more competitive coastal area and the inland regions (Martins et al., 2007).

Santos (2000) argues that the relative lack of economic dynamics in Portugal's less favoured regions arises from the limited learning capacities of their innovative systems. There is a weak interface between innovation support infrastructures and very weak interaction between key actors, thus severely limiting the possibility of effective regionally based innovation systems.

This weakness is compounded by the tendency of Portuguese firms to be rather inward-looking and to lack a culture of cooperation. Furthermore they demonstrate human, technological and financial handicaps, namely, the predominance of non-qualified labour, the lack of investment in R&D and other, less tangible factors, such as the low density and quality of innovation infrastructure and the thin institutional base (Santos, 2000; Eurostat, 2012b). The Portuguese learning context presents therefore characteristics of a less favoured region.

3.4.3. Venture capital and R&D investment

Access to finance or other resources and sources of advice on new markets and clients are crucial to GOFs (Etienne et al., 2008). The Portuguese context is characterised by a shortage of financing sources, particularly long term investment targeted at R&D projects. According to Teixeira and Grande (2013) in a study of barriers to spin-off in Portugal, the principal barrier to the firm development was of a financial nature (cash flow; capital investment; R&D investment), principally in terms of the very underdeveloped domestic venture capital market.

As a result, SMEs, facing obstacles in accessing external finance, are highly dependent on internal equity to finance their investments. Bartholdy et al., (2012) in a study of the funding sources used by Portuguese SMEs, found that internal equity was the primary funding source. On the other hand, bank loans were experienced as expensive and found to be secondary in relation to internal equity. Moreover, GOFs had to show substantial internal equity to persuade the bank to expand loans for some tangible assets.

Intangible assets (e.g. R&D and design capabilities) are associated with asymmetric information which firms are keen to protect, also reinforcing a tendency to rely on internal equity. Portuguese GOFs have been found to make particular use of short-term bank loans, principally to obtain short-term liquidity and occasionally, together with leasing, to finance tangible assets (e.g. machinery) which are less associated with

asymmetric information (Bartholdy et al., 2012). In terms of long term investment, their internal equity is critical in funding R&D projects.

Additionally, public support for R&D in SMEs has been shown to have had relatively little impact. Serrasqueiro et al., (2011) for instance, in a study about the funding sources of Portuguese SMEs', argue that these firms evidenced high rate of internal self-funding together with short-term debt to fund their R&D activities. This complicates their operations and R&D investments as they need to pay off the debt over a short and constant period. Also, the Portuguese stock market is less developed and most Portuguese SMEs do not meet the requirements needed to achieve listing.

3.4.4. Education and workforce

The Portuguese educational system demonstrates a number of limitations, with levels of both education and R&D spending being low relative to other members of the EU (Eurostat, 2012b). This overall weakness is also reflected in the lack of competent managers, engineers and certain skill areas. In addition, the high level of employment protection promotes low labour mobility, resulting in a limited capacity to rearrange human resources in response to new business opportunities. Some structural reforms have been carried out to address these problems, including increased training in the labour force to provide better education in terms of ICT skills, vocational training schemes and generalized access to World Wide Web (The Economist Intelligence Unit Limited, 2009).

The human workforce remains a key bottleneck, although doctoral graduates in 2009 were above the OECD median (Eurostat, 2012b). The poor indicators for R&D suggest that investment in science, technology and innovation in Portugal in the last decade, although necessary, has not yet proved sufficient to enable the Portuguese innovation system to promote a growth of value added firms. Figures from Eurostat (2012b) further this poor picture of Portugal's innovation system:

- Gross domestic expenditure in R&D was 1.66 of % share GDP (against 2,1% in EU-27);
- The proportion of research and development personnel by sector is less than 1%;

- Employment in high and medium-high-technology manufacturing industries amounts 12.8% of total employment (against 18.9% in EU-27);
- The total number of R&D personnel saw a significant increase between 2005 and 2010 in Portugal (15.3 %), compared to the average of 2.6% in the EU-27;
- The stocks of Human Resources in Science and Technology (HRST) increase in average 3.2% annually from 2005 to 2010;
- Portugal accounted for the smallest share of HRST among the labour force in the EU, with 22.0%.

Most of these indicators are well below the 27-EU average and highlight the weak linkages between Portuguese universities and industry. According to Santos (2000), there are a considerable number of reputable research institutions, but the process of knowledge transfer to industry remains inadequate. Teixeira and Fortuna (2004) confirm a long-term relationship between poor productivity and weaknesses in the education levels of human capital and internal innovation capability in Portuguese SMEs. Improvements in the quality of human capital would therefore seem to be particularly important for Portuguese economic growth, through its impact on productivity and indirectly via the wider uptake and application of new knowledge within industry.

According to Teixeira and Grande (2013), the weak linkages between universities and SMEs are attributable to cultural differences and the lack of entrepreneurially minded staff within the university sector, further reducing the possibilities for productive interaction with industry. For instance, graduate courses in most Portuguese business schools fail to address many of the most relevant issues for SMEs' international managers (Pinho and Martins, 2010).

Studies show that Portuguese owner-managers often lack business knowledge, in terms of marketing, sales and customer service and experience difficulties in dealing with business uncertainty and issues related to exporting to international markets (Pinho, and Martins, 2010; Teixeira and Grande, 2013). Lack of knowledge of potential client markets, particularly in identifying clients overseas is compounded by a substantial lack of formal training for managers that do not have sufficient competences for dealing with

the high level of competition in foreign markets (Pinho and Martins, 2010). Furthermore, there is a lack of institutions and services in market-oriented activities (e.g. market monitoring).

Oliveira and Teixeira (2011) similarly found a lack of international business skills in some SMEs' owner-managers, including amongst the executive teams of high tech firms. Pinho and Martins (2010) identified the need for a more focused vocational training of managers, for instance in terms of design and formal exporting, targeting the needs of SMEs in order to augment their marketing effectiveness. In particular, Portuguese SMEs reveal a lack of product suitability in terms of product design, important to accomplish different client preferences and diverse socio-cultural settings.

3.4.5. Firms' 'openness' to innovation

In Portugal, the proportion of innovative enterprises, i.e. those which had introduced products that were new to the market or own-developed process innovations, represented 20.5% of the total between 2008 and 2010 (Eurostat, 2012b), compared to the EU average of 23%. These data suggest that these firms (mostly SMEs) innovate moderately, at just below the EU average (Eurostat, 2012b). Santos (2000) posits that in Portugal, innovations rely on already existing knowledge and evolve incrementally. However other studies dispute this and suggest that Portuguese SMEs build learning capability mostly through informal and distant networking processes (Vale, 2004).

Indeed, Lopes and Teixeira (2009) in their study on 'openness' in terms of innovation in 70 firms located in Portugal found that 'openness' practices were only partially diffused throughout these firms, being more widespread in terms of external absorption of knowledge rather than two-way knowledge transfer. Knowledge transfer is not a systematic practice of the surveyed Portuguese companies, since less than 10% of the surveyed firms licensed their technology to other organizations, indicating a lack of awareness about the economic potential of internally created technology to third parties. The study shows that a very low percentage of companies 'opened' their transfer of knowledge and technology to other organizations whilst the vast majority (77.1%) had a rather closed innovation model (Lopes and Teixeira, 2009).

Lopes and Teixeira (2009) further argue that firms located in a country with a poorly developed innovation system tend to share a relatively closed approach to innovation, as

compared with companies located in countries with advanced technological development. Their study found that 60.0% of the studied companies acquired their technologies casually (Lopes and Teixeira, 2009), which indicates that in general, Portuguese SMEs carry out an informal and unsystematic search for new opportunities. Interestingly, some companies displayed relatively 'open' approaches to innovation, including in some traditional, albeit knowledge intensive, sectors (e.g. Iberomoldes (moulds); Aerosoles(footwear)), but principally in the more high tech sectors related to information and communication technologies (e.g. Portuguese Telecom). Moreover, another study on the learning ability of Portuguese SMEs (Fernandes and Ussman, 2013), concluded that these companies demonstrated little organisational learning, with their owner-managers evidencing a decision making process strongly confined to the top management team that neither exploited the possibilities presented by their employees, nor designed the firms' operations to create learning opportunities.

Another relevant characteristic of Portuguese SMEs relates to the nature of the partnerships they engage in. Portuguese SMEs, principally the low tech firms with little R&D intensity, tend to interact with other companies rather than with scientific and technological organizations like universities or R&D institutes, showing little 'openness' in terms of innovation. Hence the study by Oliveira and Teixeira (2011) found no cases of firms involved in co-operative R&D efforts with a partner/business associate. Also according to Laranja (2009), the proportion of SMEs with innovation activities, involved in innovation co-operation with universities, is of 5%, relatively low compared with 9% in Europe, whilst the main source of external co-operation for firms' innovation in Portugal is external suppliers (i.e. of equipment).

Dorrego, et al., (2013) in a study about the influence of relational capital on product innovation in Portuguese SMEs, showed that relational capital has a positive impact principally through vertical relationships with customers and suppliers (an effective way to gather business knowledge), aimed at improving the firm's product innovation capabilities whilst other more 'horizontal' relationships (with partners and competitors, shareholders, investors and other institutions), did not show a significant effect on product innovation at the studied companies.

These findings reflect a lack of local cooperative culture and networking amongst Portuguese SMEs and in relation to other potential innovation actors. Although most of

the literature on innovation in SMEs tends to highlight the role of physical (geographical) and cultural proximity, Portuguese firms' partners tend to be located abroad, with little evidence of regionally embedded innovation networks and practice (Santos, 2000). Hence innovation is not necessarily dependent on proximity between key actors (shown to be lacking in the Portuguese case) and effective regional innovation systems; strongly embedded actors and networks are also dependent on strong linkages beyond the region. Teixeira et al., (2013) argue that technologically more complex projects in particular are more likely to involve 'culturally' and geographically more distant partners. Conversely, SMEs from weaker regions in terms of human capital and innovative performance may, in general, lack networking competencies, compelling them to concentrate on more culturally proximate partners (Teixeira et al., 2013).

3.4.6. The institutional context of innovation

Institutions – including a range of government policies, laws and regulations and how they are implemented – have a crucial impact on economic growth and the effectiveness of innovation systems. In Portugal, a number of studies indicate that poor regulation and excessive bureaucracy is a barrier to business development and growth in general. For instance, a report by the OECD (2012) identifies important regulatory limitations, such as significant delays in the court system or the transposition of EU regulations that are still below the EU average. Similarly, Teixeira and Grande (2013) found that many firms experience regulations and bureaucracy as crucial barriers to firms' innovation.

According to the OECD (2012) however, Portugal has made significant progress towards the development and implementation of policies for better regulation within a short time span. Specifically, it has launched programs for improving the quality of the legal system and reducing administrative barriers (e.g. Simplex[7], ICT portals for citizens and business) that have simplified the procedures for establishing a business or licensing. These programs have promoted the sharing of regulatory databases and more inter-ministerial cooperation. Such initiatives need, however, a change towards a more cooperative culture across the administration, relying on more open exchanges in the development of new policies and regulations.

[7] A program focused on administrative simplification, aiming at improving regulatory frameworks, processes and procedures of central government.

The national innovation system is highly centralised, with the majority of institutions that provide direct support for innovation being politically and financially dependent on the central administration. It has been argued that this highly vertical structure prevents horizontal cooperative behaviours between the regional actors, within a context where regional/localised innovation is weak and poorly resourced (Santos, 2000).

According to Laranja, (2009), Portuguese organisations related to technology transfer were established by central government initiative and funded by European structural funds, which complicated the connection between local industrial activity, government-funded institutes and firms undertaking R&D. There are sector technology associations, located in regions that specialise in particular industrial sectors (e.g. footwear), which provide technical support services (e.g. testing), information and demonstration actions. A further component of the Portuguese innovation system corresponds to institutes and associations whose initiative and mission have considerable input from academia - the university-based institutes for R&D and technology transfer. The number of patents registered in these institutes is low, as well as the proportion of innovative enterprises involved in cooperative activities with universities (Laranja, 2009).

The findings of these various studies indicate the extent to which poor institutional infrastructure, particularly in terms of innovation support, has contributed to Portugal's uneven development. Portugal demonstrates characteristics of a less favoured region – e.g. institutional inertia, lack of access to innovation, low levels of skilled workers and a mature industry where competitiveness is based on low technology and labour costs. However, it also possesses a good physical infrastructure for transport and communications and a high rate of investment in higher education.

This complex picture in terms of economy, institutions and innovation presents a distinct configuration of growth opportunities and barriers to its diverse owner-managers and SMEs. Hence, Portugal provides an appealing '*laboratory*' to observe how growth-oriented SMEs deal with both the general economic crisis and weaknesses related to national institutions. This study therefore aims to better understand how Portuguese entrepreneurs and firms from diverse industries cope with this macro context in accessing knowledge, personnel, markets and support.

3.5. The sectoral context

In addition to this wider macro context, there is a need to recognise the particularlitie of sectoral contexts. This recognises that different dynamics of learning and growth are likely to come into play according to varying sectoral characteristics relating to issues such as technology and the nature of competition and regulation,. For instance, a general regulation applied to all businesses in an economy is likely to impact differently on different sectors, such as biotech and footwear.

This study focus on the learning processes through which entrepreneurs and firms acquire knowledge/ qualification, partners, finance and markets, in different locations and sectors, over time. As discussed, a large proportion of Portuguese SMEs are concentrated in traditional manufacturing industries such as footwear and wine, although this dominance of traditional sectors is changing, with high tech sectors such as biotech and software contributing to significant improvements in innovation indicators (Eurostat, 2012b). However, high technology and potential high growth industries remain underrepresented in the Portuguese productive fabric. In 2012, high and medium high-technology sectors represented only 3.1% of all companies – INE, 2012a) and there were only 40 biotech firms nationally. This study therefore focuses on growth-oriented SMEs operating within both traditional and high tech sectors. These sectors comprise: biotechnology, ICT, moulds, footwear, wine and cork.

3.5.1. The biotechnology industry

Traditionally the biotechnology concept consists of '*applying either micro-organisms or biologic systems components to obtaining value added products and services*'[8]. The new biotechnology science has a wide range of applications including the agro food industry, life sciences, textile, chemical, environment and services such as consulting. In this study, the applications to the life science industries will be analysed.

The biotech industry, which is multinational in scope, innovates continuously through for example networking and strategic alliances with other actors and across multiple stages of product development, in order to grow. Firms' learning processes tend to expand towards an international innovation scope, involving multiple institutions,

[8] Diagnóstico do Instituto da Biotecnologia e das Ciências da Vida em Portugal. (Industry Diagnostic of the Biotechnology Institute and Life Sciences in Portugal) April 2005.

policies and firms (Fontes, 2003). The industry presents distinguishing learning mechanisms of interest to understanding the learning process in growth-oriented SMEs (Orsenigo, 1989; European Commission, 2002).

Learning and growth seem most intertwined in biotech SMEs because there is a need to explore new knowledge at an inter-organisational level in order to succeed. Such knowledge, while scientific, tends to be highly protected given the competitive importance of intellectual property and reliance on patented knowledge. Given that most biotech owner-managers are young technologists short of business knowledge and the Portuguese context does not provide enough managerial skills, it is of interest to understand how management capabilities and appropriate investment sources are attained in order to grow.

To use effectively indigenous capabilities and external networks, entrepreneurs and firms need to establish close relationships with actors within their innovation system, such as knowledge centres, where advanced scientific and technological knowledge is produced (Fontes, 2007). This process is more difficult for firms peripherally located away from the main knowledge concentrations. The search for knowledge at a distance, and the establishment of distant relationships was found to be more costly, slower to achieve (because trust may take longer to develop), and more complex to manage (Edwards et al., 2005).

The history of the Portuguese biotech industry can be traced back to the 1990s, although significant numbers of start-ups only emerged in the 2000s. The sector is still small but growing, with just over 40 biotech companies in Portugal in 2012, most of which were created between 2001 and 2006 (a growth rate of 85%). These businesses tend to be small and dependent on highly qualified staff (i.e. with 5 to 20 high qualified people, e.g. PhDs), distributed over the areas of Lisbon (85%), Porto and Coimbra and with their clients concentrated in the health care, agro-food and environmental sectors.

Such development in recent years is associated with a combination of favourable factors (Fontes, 2007), namely the increasing quality of some research institutions as well as the availability of a large number of underemployed young scientists. These have combined with changes in the institutional context, such as increasing interest from the investor community and new public support programmes, which led to increasing

initiatives involving the commercial exploitation of biotech R&D knowledge. This is despite the lack of a national strategy for biotechnology or an integrated strategy that addresses, in a coordinated way, the various actors and need for a more effective domestic network (Fontes, 2007).

Portugal has emerged as a promising setting to address these issues, given the dependence of biotech firms on being able to obtain scientific and technological knowledge through a (diverse) combination of indigenous and foreign sources despite the Portuguese context of a highly centralised knowledge infrastructure and little public support (e.g. public funding, international business training). In the Portuguese context, these particular SMEs set a specific learning trajectory. They have benefited from private investments in R&D and the launching of new biotechnology parks, such as the Biocant Park, which is now hosting 15 companies linked to research. Particular venture capitalists (e.g. Biocant Ventures) have financed the initial stages of biotech projects (AICEP, 2012). This has meant that this sector has evolved in the absence of supportive policies and in a context in which indicators for business R&D and innovation and public R&D expenditure still falls short of the OECD median. From this standpoint, Portugal provides an interesting context in which to further examine the entrepreneurial and organisational learning processes within biotechnology SMEs.

3.5.2. The information and communication technology (ICT) industry

The ICT industry can be defined as involving a '*combination of services and manufacturing industries that capture, transmit and fix in an electronic way data and information' (OECD, 2007).* The industry's main branches are manufacturing, telecommunication services and other ICT services. In general, the growth and learning processes of specialized ICT SMEs tend to be different from that of more mature industries. They often show growth through rapid internationalization, enabled by the use of external networks (Saarenketo et al., 2004). The division of labour through specialization and vertical integration tends to be quite similar to the biotechnology industry as are their learning outcomes (OECD, 2002).

ICT is nowadays a high globalised industry and there is pressure for firms to internationalize early to keep up with the competition. The so called 'opportunity windows' in these markets are often short, and there is not enough time to learn solely

'by doing' as knowledge about products and markets become obsolete extraordinarily quickly (Saarenketo et al., 2004). Firms therefore have to learn quickly how to adapt and deal with high rates of technical advance and associated uncertainties.

According to AICEP (2012), the market value of ICT in Portugal had reached € 3.220 million in 2010, which represented a decline of 2.7% compared with 2009. The ICT market in Portugal has been negatively impacted by the current financial crisis and difficult economic situation, which has discouraged investment and forced consumers to economise. The number of ICT firms in Portugal account for 0.8% of the overall firms (against 1.7% in 2002), while their turnover account for 3.6% within the total of enterprises (against 7.65% in 2002) (INE, 2012b). This study will analyse the manufacturing branch, which constitutes 4% of the total number of ICT firms, and accounts for 16% of employment in the industry.

In Portugal, Fontes (1998; 2007) argues that SMEs producing high tech software have faced particularly adverse conditions because of the lack of effective support and resources at both national and regional levels. They display relatively low levels of local "mass" in terms of R&D activities and therefore are forced to search distant knowledge sources, engaging in learning through networking. As with biotechnology firms, they face a low local demand for electronic and information technologies and engage mostly in global markets. There seems to exist few complementarities between SMEs of high tech software and local large companies, which suggest a low level of inter-organisational learning at regional level (Fontes 2007). Finally, ICT SMEs are given little institutional support and guidance considering, for instance, the low level of collaboration between local research establishments and private companies, or the lack of academic entrepreneurship and public support programmes.

ICT firms seem to face similar constraints to those experienced by firms in other Portuguese high tech sectors. Moreover, they seem to learn mainly through imitation, often by adapting innovations created elsewhere to the distinctiveness of their own particular market niches, and can thus be considered 'creative imitators', adopting a defensive approach to innovation (Fontes, 2007). Nevertheless, although ICT companies provide evidence of a successful absorption of external knowledge, namely through imitation, it is opportune to understand by what other learning processes these companies combine their internal and external knowledge in order to grow.

3.5.3. The mould industry

A *mould* is a container used to put something into a particular shape. A steel mould comprises a female and a male part that when fitted together originate a narrow gap, in which the fluid (such as plastic, glass, rubber, aluminium or other material) passes and shaped. Moulds are therefore manufactured for a wide variety of industries – e.g. automobiles, electrical industries and electronics. Nonetheless, an individual mould is a highly customised product, serving exclusively to produce the piece for which it was designed, which in turn, influences the way the mould is produced, its delivery time and its cost (Rodrigues, 2002).

According to the Portuguese Mould Industry Association (CEFAMOL), the moulds sector consists of 532 companies, mostly SMEs, committed to the production of specialized moulds and tools, and employs about 8,000 workers. The Portuguese sector accounts for almost 1% of companies, 1.1% of employment, 0.8% of turnover and 1.4% of Gross Value Added (GVA). The main target markets for the Portuguese moulds are within the European Union, which accounts for 80% of sales (INE, 2012b). In 2011, the industry exported about 364 million euro (almost 1% of national exports). Plastic moulds account for nearly all of production, which is largely aimed at international markets and represented almost 80% of the total exported by the industry in 2011. The client industries are principally the automotive industry (72%), packaging, electronics and telecommunications, and household appliances.

The industry is highly concentrated geographically in central Portugal in the towns of Marinha Grande and Oliveira de Azeméis, which has fostered innovation and organisational competitiveness (Camagni, 1991). In the 1980s the Portuguese mould industry underwent a remarkable development. Internationally, the plastic market was growing quickly; plastic goods were becoming more fashionable and the sheer flexibility of plastic as a material meant that its use grew considerably in many different applications. In the 1990s, the Portuguese mould industry continued to grow, but at a slower rate, as a result of increasing competition, an international economic crisis at the beginning of the decade, and high interest rates.

The Portuguese mould industry has grown to gain a global significance due to increasing international demand and the experience of domestic mould producers,

which means they provide accurate design, quick delivery times, competitive prices, and technical assistance. Portuguese companies have become global suppliers of precision moulds, primarily for the plastics industry (AICEP, 2012) and have shown over the years a capacity to adapt to markets and technological changes, and respond to the threat of the Asian mould industry with lower production costs (Moreira et al., 2009).

Despite being a traditional sector, the mould industry relies on high technology and supplies highly demanding client sectors, such as the automotive sector. According to Lopes and Teixeira (2009) such technological intensity relates to a relative 'openness' in terms of innovation procedures - i.e. with regard to the use of external knowledge and technology and transfer of technology to other organizations.

It is of interest to understand how the entrepreneurial experience of predominantly industry oriented owner-managers suits a high internationalized sector that demands high customer proximity and co-development.

3.5.4. The footwear industry

The Portuguese footwear industry represents about 3.2 % of all companies, 5.6% of employees, 2.4% of the volume of business, and 3.1% of GVA. It has particular specialization in leather footwear, which accounts for 88.2% of companies, 92.7% of employment, 89.8% of GVA and 88.3% of the volume of business of the leather and leather goods industries (INE, 2012b).

In 2011 the industry's exports were about 1,551 million euro, representing 3.7% of overall Portuguese exports and an increase of 15.5% from 2010. This industry is finding new markets and is already strongly internationalized across more than 132 countries. In 2010 Portugal was the 11th largest shoe exporter in the world (AICEP, 2012).

The Portuguese footwear industry is currently undergoing a consolidation phase. After adapting to new competitive situations, which led to the closure of a number of international factories, the footwear industry is now growing again. In recent years, the industry has downsized, repositioning its business model by moving production capabilities towards higher quality designs and markets, with strong brands and adopting a more proactive business posture.

Made up mostly of SMEs, this industry employs about 33,000 people according to the industry's association (APICCAPS); its production is around 62 million pairs per year (20th producer in the world as per volume), mainly to meet international demand (90% of production is aimed at international markets). Although it faces increasing competition from low cost producers, the footwear industry still produces a trade surplus and positive contribution to the country's trade balance within the manufacturing sector (AICEP, 2012).

According to APICCAPS, women's shoes correspond to nearly half of national leather footwear production and 45% of total shoe production. This is significant in terms of value, because of the higher average shoe price, which represents more than 25 euro per pair. Footwear produced with the contribution of other materials (textiles and plastics) corresponds to one-fifth of national output and accounts for only 13% in terms of value, given that the average price is lower (around seven euro per pair). Leather footwear, with almost 900 exporting companies represented 85% of Portuguese footwear exports in 2011, and increased 16% compared with the previous year.

This sector is of particular interest due to recent efforts to strategically reposition itself from a low cost product to the production of a highly customised and quality shoe, with a relatively high level of technological intensity and correspondent 'openness' in terms of innovation procedures in transferring knowledge and technology (Lopes and Teixeira, 2009). Such change indicates a major innovation in terms of in-house capacity and flexibility in moving towards high quality demand at international level. Thus, it is interesting to explore the learning processes by which owner-managers in this traditional industry have responded to changing international conditions.

3.5.5. The wine industry

Portugal has held since 1756 the oldest demarcated wine region in the world, the Douro valley. At the beginning of the 20th century, several wine regions were demarcated and in 1986, these regions were re-defined as Portugal joined the European Union (The Oxford Companion to Wine, 2006). Overall, the Portuguese wine industry represents 1.5% of companies, 1.2% of employment, 1.8% of the volume of sales and 1.9% of GVA in the manufacturing industry (INE, 2012b). According to IVV (The Vine and Wine Institute), wine exports accounted for 1.6% of overall Portuguese international

sales by value. The importance of the industry to the national economy is reflected in the fact that 7% of all agricultural land is devoted to wine production (IVV, 2010). Portugal is ranked 5th among European wine-producing countries and 10th at the world level (IVV, 2010).

Recent years have seen a campaign to restructure vineyards, in order to meet market demand, with support from European Community aid. In 2012 there were 11 wine producing regions in Portugal, each with a different culture that is reflected in the wine produced. Since Portugal's accession to the EU, the industry has benefited from substantial investment in up-to-date production techniques and technology, bringing about substantial improvement in the quality of its wines.

The Portuguese wine market is highly competitive and is composed of many organisations, including small, medium, and large private companies as well as cooperatives. The wine produced by cooperatives is the product of the small landowner farmers, who deliver their grapes to the cooperative for processing, distribution, and sale. In terms of regional structure of wine production by volume, the regions of Tejo, Beiras and Lisbon produce 40% of the total, while the Setúbal Peninsula and the Alentejo amounted to 20%. The regions of Minho, Douro produce in average 37% of all wine. In Madeira, the wine production accounted for 1% of total and Trás-os-Montes accounted for 2% (IVV, 2010).

In 2008, there were 30,000 wine producers registered with the regulatory body. Research suggests that the Portuguese "wine cluster" does not have an articulated strategy for its development and growth (Pestana and Santos, 2007). This may be explained by the small scale of many of its producers, limiting the extent to which they can, individually, create market power in foreign markets. Moreover, the choice of the export markets has tended to be based on easy sales (targeting culturally near markets) instead of consumers that may give higher returns. Recent change has focused on applying new processes, technologies, expertise, and creates new brands, in order to boost all Portuguese wines in the markets.

The distinctive characteristics of the sector therefore include its traditional structure of individual firms that rarely collaborate, its high labour intensity, heavy reliance on social capital and with some recent experience of modernisation and technological

upgrading in support of internationalisation. It is therefore opportune to study how firms in this sector have responded to the opportunities and challenges posed, given their heavily traditional knowledge base and the need for learning and innovation.

3.5.6. The cork industry

About 32% of the world's cork forests are found in Portugal, along with 22% in Spain and 37% in the Maghreb. Portugal is proceeding with a reforestation policy at the rate of 10,000 hectares per year, and has a forested area of 730,000 hectares of cork trees (23% of national forest). In the cork industry, Portugal is the world leader in the production and transformation of cork, accounting for about 53% of world production, with 90% for export. This industry produces cork wines, discs, different types of floats, shoe soles, printing paper, cigarette tips, bath mats, table mats, hat bands, fishing rod handles, and different kinds of packing. Cork wool is produced for cushions and mattresses and granulated cork employed chiefly as insulating material in shipbuilding, as protective packing for fruit and eggs and as tubing for plastic substances.

This industry is, therefore, of significance to the national economy, representing 1.2% of GVA and 1.3% of employment, 1.6% of the volume of business in the manufacturing industry, 2% of all national exports, and about 17.5% of total exports of forestry products (AICEP, 2012). Bottle corks account for more than 70% of the export total and the Alentejo amounts for 72% of all cork produced in Portugal. The manufacture of cork products is spread over 12 districts with Aveiro and Setúbal representing the main focus on employment (58% and 28%, respectively).

Forest products represent about 5.3% of national GVA, 14% of industrial GDP, 5% of industrial employment and about 11% of Portuguese exports (INE, 2012b). SMEs prevail in the industries of wood, furniture and cork. According to the sector association (AIMMP), the wood sector represented about 5,000 companies and 54,000 jobs. These companies created a 2.5 billion euro business, of which 52% has aimed at international markets. It accounts for 2.2% of national GVA, and 9.4% of GVA in the manufacturing industry (INE, 2012a).

Cork, a traditional Portuguese product, is an extremely light, compressible, elastic and flexible material, practically impervious to moisture. The combination of such qualities in one substance led to its widespread industrial utilization. It became extremely

prominent following the invention of glass bottles and the massive growth in sales of beverages which drove the large-scale production of suitable cork wines.

This sector has increasingly diversified into varied products beyond the traditional cork stoppers; additionally, it is highly internationalized and has progressively enhanced its technological sophistication. This recent improvement in innovation performance makes the sector an interesting case study of how both technological improvements and internationalization are impacting upon the firms' growth and learning processes.

3.6. Context and firm learning: summary and conclusions

This chapter has examined the need for a contextual dimension, in terms of economic, institutional, industry and market characteristics, to inform understanding of the learning process of growth-oriented SMEs. Building upon this, we have set out an informing conceptual framework for this study, which integrates the notion of context with concepts of entrepreneurial and organisational learning. This provides a framework through which to analyse the interplay between entrepreneurial, organisational and interactional learning processes within firms and how they are realised in specific national, regional and sectoral contexts, specifically here, in relation to the case of Portugal.

Portugal displays a set of distinct and significant characteristics in relation to firm learning and innovation. These include its peripheral location, prolonged economic crisis and uneven development, shortcomings in terms of its public support and institutions, and low levels of collaborative innovation activity within its national and regional economies. Portugal is considered a 'catching-up' country with respect to innovation. Despite significant advances over recent years, it is still characterised by low levels of employment in science and technology (Eurostat, 2012b) and an innovation infrastructure that relies on centralised government-funded institutes with a weak interface with local R&D firms and industry which limits knowledge exchange.

Portuguese SMEs operate in general within traditional sectors and tend to be relatively 'closed' in terms of transferring knowledge and technology from and to other external actors, with their preference not to engage in collaborative partnerships thus limiting the potential for two-way inter-organisational learning. Some studies also show that weak interaction between regional innovation actors prevails, with few examples of local

partnerships. Learning and innovation is more often a result of vertical interactions, for instance between clients and suppliers. In contrast, those sectors where survival is more reliant on accessing external knowledge and resources (e.g. biotech) tend to develop partnerships and alliances that are international in nature, meaning that their innovation activities and related networks do not become regionally embedded.

The weak linkages between Portuguese universities and industry increase the difficulty of developing competent managers with relevant international business knowledge. The lack of effective linkages between Portuguese SMEs and local regional actors, limits the extent of regional learning processes. At the same time, the domestic venture capital market is underdeveloped, which influences the lack of investment in science, technology and innovation (e.g. in the development of design capabilities).

Government policy makers and other key actors in industry, such as sector associations, have largely recognised and accepted this scenario, and reforms have been underway in recent years. Steps are being taken to involve public and private actors (e.g. through financing schemes), but it remains to be seen if and how the main bottlenecks will be addressed and whether a local capability development process can take off. Portugal is also carrying out necessary reforms in order to shift its economic profile. Yet, the change has been slow, and the recent global crisis has worsened the situation. At the sector level, evidence suggests that firms continue to experience similar problems of limited knowledge supply and demand, institutional rigidity and lack of finance. Overall, indicators suggest that Portugal continues to remain one of the least favoured regions within the EU in relation to innovation.

The rest of this study will explore in further detail the influence of this complex and uncertain context upon the learning processes of a sample of growth-oriented SMEs and their owner-managers/leaders. The research methodology adopted and the methodological challenges presented by this research are considered in detail in the next chapter.

4. Chapter Four: Research methods

4.1. Introduction

The particular object of study for this research was a set of economically significant SMEs, commonly referred to as growth-oriented SMEs, which were investigated in order to better understand the development of their learning processes. To achieve this we adopted a qualitative case study approach as this appeared to provide the most appropriate means of understanding this research phenomenon (Stake, 1995). Few existing qualitative studies address the learning relationships between SMEs and their environment, upon which GOFs seem to be particularly reliant (Etienne et al., 2008). Current research on entrepreneurship primarily offers snapshots of individuals and organisations disregarding their stories. Here, a set of nine growth-oriented SMEs, from different industries and learning contexts, are analysed in greater depth. The adoption of a qualitative case study methodology enabled investigation into how interactive, organisational, and entrepreneurial learning combine to influence SMEs' learning outcomes, and provides insights into the interaction between these dimensions which quantitative studies struggle to achieve.

This chapter presents the overall research methodology used in this research. It details the methods employed in this study and the different stages involved in the research process, namely the phases of the case study research, and how data was collected, analysed and reported. It also reflects on how these methods evolved in face of the challenges faced in undertaking the research.

4.2. The chosen paradigm

Interactive learning theory provides a useful starting point from which to study the learning processes of SMEs within the Portuguese context. SMEs constitute a complex bundle of interactions in which actions often vary with goals, activities lack clear structures, and measurement is difficult (Curran and Blackburn, 2001). The meanings, interpretations, intentions and world views of owner-managers, as well as the shared practical understandings of a firm as an organisation, are critical to understanding processes of interactive learning. To access such meanings and shared understandings the study adopted a qualitative paradigm in order to uncover the learning relationships

of growth-oriented SMEs and how these related to their absorptive capacity and entrepreneurial capability.

SMEs often have an extreme range of forms because of operating in different industries, with different entrepreneurs' background, skills and partnerships. Statistical generalisation is thus hard to obtain (Curran and Blackburn, 2001) and case study research strategy can be extremely effective when investigating complex change processes, where boundaries between phenomenon and real life context are not evident (Yin, 2003; Stake, 1995). It is also an appropriate research strategy when the 'how' research questions prevail and the investigator has little or no control over events (Yin, 2003).

The case study approach is well suited to the examination of learning processes, following them over time and accounting for different levels of analysis (Boekema and Rutten, 2007). Hence, analysis of real actors and their interrelationships in a social context is the most comprehensive and effective way to understand and explain how learning in different settings has contributed to the experiences of the sample of Portuguese growth-oriented SMEs.

4.3. Research design

The study adopts a multiple case study design as this is ideally suited to a comparative exploration of organisational processes in different organisations and contexts (Eisenhardt, 1989) while still capturing their particular characteristics (Yin, 2003). Cross-case patterns are identified from multiple sources of evidence to provide reliable and accurate theory and capture novel findings that may exist within the data (Miles and Huberman, 1994). Comparison between cases follows a replication logic to ensure a more robust study (Yin, 2003). The chosen theoretical framework (see section 3.3) was used to guide to the study individual cases in detail, and then successive cases were analysed to identify cross-case patterns.

Yin (2003) defines case studies as descriptive, exploratory and explanatory. In this study, all three of these approaches were utilised. A descriptive approach was adopted to illustrate the firms' learning processes and an exploratory approach was followed to bring insights into the 'what' issues arose. An explanatory approach sought to answer the questions of 'why' and 'how', aiming to establish a comprehensible causal

relationship between the processes. In this way, the qualitative approach allowed the study to address the behavioural aspects of the organisational learning process (e.g. Zahra and George, 2002).

The chosen study design arises directly out of the theoretical framework previously outlined (section 3.3 and Figure 3.2) which focuses attention on the interplay between entrepreneurial learning, organisational learning and context (Oakey, 2013). Indeed, in order to learn firms must absorb and process both internal and external knowledge, which in turn influences their absorptive capacity and entrepreneurial capability. Such processes are carried out by entrepreneurs and other individuals in a social and spatial context.

4.4. Research questions

The central objective of this research is: *to better understand how the process of entrepreneurial/ organisational learning of growth-oriented SMEs interplays with their contexts over time*. To achieve this, the study set out to answer a series of research questions:

1. *What is the nature of the learning process in Portuguese growth-oriented SMEs?*

This is the main question of the study. It is an exploratory question centred upon the process. The focus of the study is on how particular SMEs succeed in an intermediate developing region context. In attempting to better explain the causal links between organisational and entrepreneurial learning processes within a given context, the following sub questions were identified:

1.1. What is the influence of context on the learning processes of Portuguese growth-oriented SMEs?

The aim here is to understand how particular environments influence the firms' learning processes, including their ability to learn (e.g. Liao et al., 2003). The macro environment relates to wider economic institutions, which include public support, regulation, credit and taxation. The micro environment relates to particular industries, markets and a firm's internal context which includes competitive issues, infrastructures, daily practises between firms, availability of knowledge/resources, market size and

regional networks. The firms' internal context relates to their strategic posture, whether proactive or reactive, and their financial and absorptive capacity.

1.2. What is the role (and relationship between) entrepreneurial and organisational learning in responding to critical contextual events and challenges in Portuguese growth-oriented SMEs?

This seeks to ascertain the role of entrepreneurial learning within the organisations studied. It attempts to understand how the experience of the core entrepreneurial team and the way they deal with critical events, influences the organisational learning process (e.g. Cope, 2003). Significantly, the study evolved a stronger focus on the entrepreneurial capabilities of key entrepreneurs given the important role of these individuals in the firms' critical events combined with the difficulty in interviewing other actors.

1.3. How do we best conceptualize learning processes in growth-oriented SMEs?

The aim is to capture how the organisation acquires and distributes both business and R&D knowledge through learning, with reference to the role of a firms' absorptive capacity and different modes of learning. It also aims to understand the scope of relevant learning interactions and the subsequent outcomes (Zhang et al., 2006).

The development of an appropriate research methodology that links the overall conceptual framework to the answering of these research questions is set out in Table 4.1.

Table 4.1 Questions and methods matrix

What is the nature of the learning process in Portuguese growth-oriented SMEs?					
			Methods		
Conceptual Issues	**Research Sub-questions**	**Relevance to Research Objectives**	**What data?**	**How to get it?**	**How to analyse it?**
To understand growth-oriented SMEs' learning processes and outcomes. (Liao et al., 2003; Abdelgawad et al., 2013; Voudouris et al., 2010; Zhang et al., 2006; Zahra et al., 2006; Leitch et al., 2010).	How do we best conceptualize learning processes in growth-oriented SMEs?	It is related to objective (i): How a particular geographic, industry and innovation context influences the learning processes and subsequent growth of SME.	Public documentation Interviewees – owner-manager, a supplier, or a client, or a partner	Information collection Interview	Deductive / inductive categorization and connection strategies
Identify how entrepreneurial learning and distinct types of knowledge interplay with organisational learning in the selected SMEs (Liao et al., 2003; Abdelgawad et al., 2013; Zhang et al., 2006; Zahra et al., 2006).	What is the role (and relationship between) entrepreneurial and organisational learning in responding to critical contextual events and challenges in Portuguese growth-oriented SMEs?	It is related to objective (i): How a particular geographic, industry and innovation context influences the learning processes and subsequent growth of SME.	Public documentation Interviewees – owner-manager, a supplier, or a client, or a partner	Information collection Interview	Deductive / inductive categorization and connection strategies
Understand the role of distinct contexts and learning events on growth-oriented SMEs' organisational learning (Dahlander and Gann, 2010; Barkham et al., 1996; Macpherson and Holt. 2007)	What is the influence of context on the learning process?	It is related to objective (i): How a particular geographic, industry and innovation context influences the learning processes and subsequent growth of SME.	Public documentation Interviewees – owner-manager, a supplier, or a client, or a partner	Information collection Interview	Deductive / inductive categorization and connection strategies

4.5. Case study methodology

At the heart of the research methodology is a case study method. This provides a flexible approach suited to descriptive, explorative and explanatory research questions, thus allowing the creation of a variety of perspectives (Yin, 1994). It was particularly appropriate here because the learning phenomenon of SMEs was difficult to study outside its business and national settings. The case study methodology also allowed for the development of a longitudinal approach. The rest of this chapter explains how individual cases were selected, and how the case studies were conducted and analysed. It also reflects on how the research methodology encountered a number of challenges and consequently evolved to meet these.

4.5.1. Selection of cases

The selection of cases was based on the extent to which they offered an opportunity to develop theoretical understanding and to learn the most about the chosen objects of study within the research time span (Cope, 2003; Stake, 1995). The present study adopted a purposeful selection in which cases were selected to provide information that could not be obtained through other means (Maxwell, 2005). Generalization was eventually to be achieved through linking the study conclusions with the development of theory, research questions, or other cases. Each case study is unique as data were collected from diverse sources as appropriate to the case under investigation (Yin, 2003).

According to Miles and Huberman (1994), four dimensions must be considered in the selection of cases: target; actors; events; and processes. With respect to the present study, those dimensions are displayed in Table 4.2**Erro! A origem da referência não foi encontrada.**.

Table 4.2 Definition of study dimensions

Dimension	Choice
Target	Growth-oriented SMEs from both high tech and traditional industries
Actors	Owner-managers and other relevant actors
Events	Institutional, business, social and intra firm learning stimulus
Processes	Absorptive capacity; learning mode, learning scope, learning outcome;

Target

The initial step was to decide the 'target set' to be studied in order to assess the target population to be accessed (Miles and Huberman, 1994). The research targeted SMEs as they are overrepresented amongst growth-oriented firms, tend to be relatively entrepreneurial and display intense learning activity (Etienne et al., 2008). Consistent with the research problem identified and the adopted theoretical framework, the initial criteria for the selection of cases were that they had to be SMEs, displaying growth orientation, be part of different sectors and from different geographic regions in Portugal. This was in order to compare the influence of distinct contextual factors. Substantial growth in terms of sales was identified as being important as in these growth situations learning processes were likely to be particularly intense.

A theoretical sampling strategy was employed. Relevant SMEs were selected to fit the rationale of the intended research. Cases were identified after consulting with people knowledgeable about Portuguese SMEs and accessing public sources of relevant data on Portuguese SMEs (e.g. IAPMEI – Institute to Support Portuguese SMEs and Innovation). A sample of growth-oriented SMEs was identified on the basis of prospective sales turnover; i.e. firms that were regularly growing faster than the average in their industry groups. The process of selecting firms then went through the following stages. First statistical data (annual growth in sales and employees) provided by IAPMEI and INE was analysed in order to consider SME performance in more detail.

Second, industrial associations and academics aware of the Portuguese business milieu were contacted by phone to confirm the previous public information.

Through this exercise, six enterprises were identified initially both from high tech and traditional manufacturing industries. All the enterprises were contacted via email to explain the main purposes of the study and request one interview with the owner-manager, adding that their participation would be invaluable. It was stressed that the research was for academic purposes only. A follow up telephone call was made to confirm the interview. The request was accepted by all owner-managers who in general were available, with the exception of one (Pelcor), who chose to delegate the first interview to her assistant and collaborated in a second interview.

ICT and biotech SMEs were targeted in this study due to their high rate of innovation and intense learning processes even within more marginal regions. All firms were addressed through email followed by a phone call to confirm their participation in this study and their owner-managers' availability. However, there were sometimes delays in confirming interviews, which required the researcher to make persistent demands by phone and email. The transfer panel held in June 2010 suggested the addition of three more enterprises from traditional Portuguese industries in order to strengthen the comparison between sectors. Hence, three other growth-oriented SMEs from the mould, footwear and wine industries were identified and included in a research sample of nine firms, overall.

The project rationale was to seek balance and variety among contrasting cases. As growth-oriented SMEs exist across different industries the study sought to include firms that represented characteristics common to particular sectors. This included firms from high tech industries (e.g. biotech) and others from traditionally low tech industries (e.g. cork, wine). According to the existing literature, SMEs in traditional sectors seem to rely mostly on tacit knowledge and geographical proximity, making their innovation efforts particularly dependent on the regional environment. In contrast, high tech ventures seem to depend more on knowledge that is codified and exchangeable through linkages with international networks of excellence (Bellini, 2002). The study deals with SMEs that are growth-oriented ventures, from a variety of sectors, hence allowing comparisons between cases and enabling the development of theoretical understanding.

All the cases shared some characteristics that made them comparable, including their consistent and substantial growth in terms of sales. Thus, the approach was a comparative case study that applied the same research questions to a set of distinct SMEs, and compared them with each other to draw conclusions. The purpose of data collection was therefore to replicate the phenomenon in a methodical way, and to explore different dimensions in line with the guiding conceptual framework.

Actors

Once the growth-oriented firms were selected the key actors identified were managers within these firms who were not only pivotal in the learning process, but who also had strategic responsibilities with regard to adapting firms to their context. Interviews with the firms' owner-managers or CEOs were therefore appropriate because they, themselves, participated in the learning and growth issues being investigated.

It was also intended to interview a wider group of key actors inside and outside the firm including those who made up the entrepreneurial team. A request was made to interview these other key staff (e.g. technical managers and specialised staff involved in innovation) although this was largely met by refusal across all cases. It appeared that this refusal was largely due to concerns relating to the need to protect firm's confidential information. However, a number of key external actors (seven) with whom firms had collaborated with were interviewed: one client (from the ICT sector), one supplier (footwear) and five partners (one from biotech, cork, and moulds, and two from footwear).

As SME owner-managers are busy people and in order to overcome any scepticism about the research and gain their co-operation, it was necessary to emphasise the value and relevance of the research The researcher negotiated the necessary trust and reciprocity through presenting the researcher, the study and institution as of high quality, able to provide useful practical insights to the owner-manager, as well as ensuring the confidentiality of sensitive data. In this way, the study sought to provide a worthwhile experience to owner-managers and to avoid them feeling 'used'.

Events

Analysis particularly focused on how critical incidents and external environmental variables impacted on firms' learning processes and growth in different ways (Bell and Young, 1998 and Bell et al., 2004). In this manner it built on the previous discussion of the connection between external triggering stimuli and growth (e.g. Greiner, 1972), organisational learning theory (Zhang et al., 2006), and interactive learning theory (Boekema and Rutten, 2007; Dahlander and Gann, 2010). This approach is discussed in further detail in chapter five.

Processes

The study aimed at following up the cases across two years to identify developments in their learning processes. During that period, two periodic interviews were negotiated to explore the learning processes of SMEs in their context over time. The study of an enriched sequence of events is paramount to understand processes and outcomes (Sadler-Smith, et al., 2001). This study therefore links process and outcome aiming at holistic insights rather than singular understandings. Context, process, and the outcome, were thus researched within and between cases (Pettigrew, 1990).

4.6. Profile of case firms

This section provided a descriptive profile of the individual cases, in terms of their main activity, history, resources, and basis of their competitive advantage. The nine firms that took part in the research were from diverse industries (see Table 4.3), were all privately owned, had differing ages and sizes, and at the beginning of the study had a growth-oriented profile in terms of sales.

Three enterprises were from the ICT industry, two firms from the biotech industry, and one firm each from the mould, wine, footwear and cork industries respectively. All the enterprises were private owned. Examining nine SMEs allowed a more in-depth analysis of their entrepreneurial learning processes over time, although this limited the scope for more exhaustive interviewing of other relevant related actors (e.g. suppliers, clients and partners). Nine case replications in different industry contexts constitutes a high degree of certainty to multiple case results, given that Yin (2003) argues that a large degree of certainty is likely to be achieved by six or more replications.

The companies were divided into two groups to facilitate the case study analysis and provide a basis for comparison of the learning processes and innovation involved: a) high tech firms and b) manufacturing firms in more traditional Portuguese industries (e.g. shoes, cork and wine) (see Table 4.3**Erro! A origem da referência não foi encontrada.**). Two were spinouts from universities; one a start-up from the biotech industry and the other a software firm with more than a decade in operation, which had spun-out a further four firms.

Table 4.3 Firms' Basic Features

	Company	Birth date	Industry	Domain
High tech	YDREAMS	2000	Software	Games, virtual marketing;
	BIOTECNOL	1996	Biotechnology	Clinical assays and development cancer treatments;
	BIOALVO	2002	Biotechnology	Industry drug development in the nervous system diseases;
	ALTITUDE	1995	Software	Customer Relationship, Management (Call Centers);
	NFIVE	1996	Software	Electronic ID cards;
Traditional	PELCOR	2003	Cork	Cork products;
	MOLDENE	1983	Moulds	Moulds for plastic injection (knowledge intensive);
	SOMARQUES	1973	Footwear	Women's shoes;
	ACSMV	1956	Agro-food	Wine.

The one firm from the mould-making industry, which is often considered a traditional industry in Portugal, is defined here as 'knowledge intensive' as it adhered to Bell et al.'s (2004) categorization criteria of having a high level of scientific knowledge embedded in both product and process. Following Bell et al.'s (2004) conceptualization, ICTs and biotech firms were considered to be technologically-based as they incorporated advanced new technologies in their products and processes. Moreover, high tech firms tend to demonstrate high knowledge intensity in their marketing and sales functions as well, which was not the case in the mould-making company which

exhibited sophisticated knowledge intensive processes in its productive and design functions only (e.g. computer-driven processes).

Although the firms in the sample varied in size, it was believed that this factor should not serve as the prime basis for categorization due to the importance of factors other than size and also due to variations between sectors. All companies were SMEs at the beginning of this study although one case grew in its number of employees to be classified as a large enterprise from 2010 onwards. In our sample, biotechnology and younger firms were smaller compared with mature internationalised firms, regardless of the industry, while all of the firms in the manufacturers group are considerably smaller than the largest firms (YDreams and Altitude). Seven firms were small in size (50 or fewer employees); one was medium-size firm (51 to 250 employees). The one case (Altitude) which grew rapidly to employ more than 250 employees during the study had 380 employees by 2010 and 454 by 2011, as it increased its number of sites worldwide. Two firms that had expanded their activities and sales abroad subsequently downsized and reduced their number of employees (see Table 4.4).

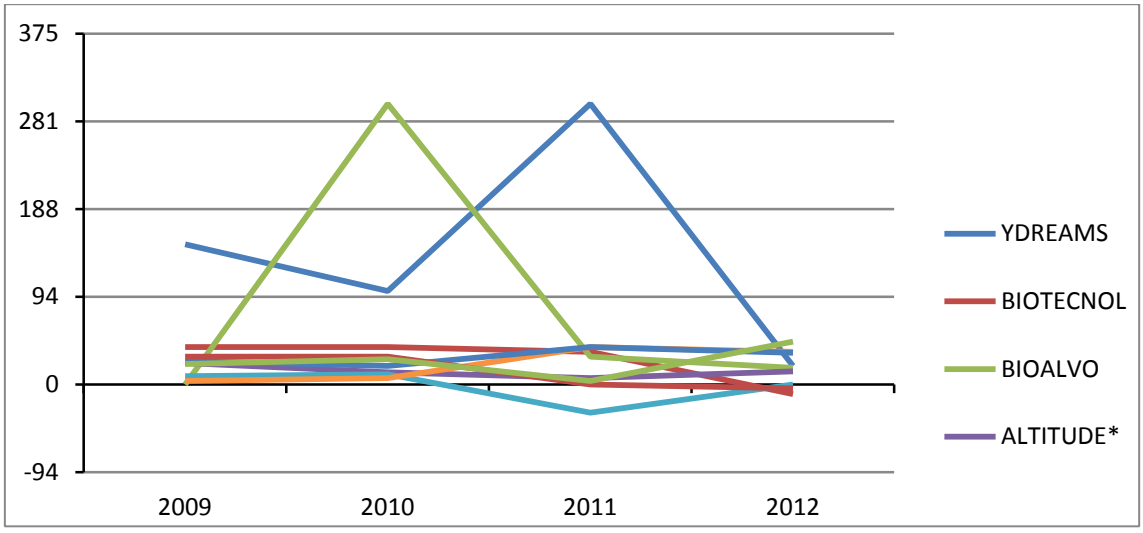
Table 4.4 Employment and sales growth (2010-12)

Year	**2010**	**2011**	**2010/2011**	**2008/2009**	**2009/2010**	**2010/2011**	**2011/2012**
Company	N° of employees	N° of employees	Growth of employees (%)	Growth in sales (%)	Growth in sales (%)	Growth in sales (%)	Growth in sales (%)
YDREAMS	150	100	-33	150	100	300	20
BIOTECNOL	25	26	5	40	40	35	-10
BIOALVO	15	15	0	0	300	30	18
ALTITUDE	380	454	19	23	13	7	14
NFIVE	25	12	-48	9	11	-30	0
PELCOR	4	5	25	4	7	40	35
MOLDENE	50	55	10	25	20	40	34
SOMARQUES	50	50	0	30	30	0	-4
ACSMV	38	38	0	22	27	4	46

At the outset of the study (2006) all of the firms selected demonstrated their growth-orientation in terms of 25% current yearly sales growth; and most reported sales growth above 20% on average for the three preceding years in line with the OECD's 'high

growth' criterion. However most were unable to sustain this earlier substantial growth rate and experienced decreasing sales after 2008, which many attributed to the global economic crisis (see Table 4.4). Although all the firms studied were increasingly internationalising they also reported falling domestic sales. From 2008, only two manufacturers and one high tech firm increased sales through international business. As Figure 4.1 **Erro! A origem da referência não foi encontrada.**shows, two firms (YDreams and Bioalvo) demonstrated particularly irregular growth patterns characterised by high peaks of sales growth followed by troughs. Another (NFive), experienced an abrupt fall in growth in 2010/11, while two others (Biotecnol and SOMarques) reported negative results in 2012.

Figure 4.1 Firms' growth profile in terms of sales (%)



Note: * In 2005/2006, ALTITUDE had a growth rate of 80%, NFIVE 60% and PELCOR 33%, in terms of sales

4.7. Data collection and sources

Qualitative research methods were selected for this study in order to generate data that is rich in detail and contextually embedded. In this study, data collection was structured so as to focus on the key issues, avoid dealing with an excessive amount of data and to facilitate analysis, while also including the possibility of revision where new insights emerged. In addition, triangulation of different methods and data was applied to validate constructs (Yin, 2003) and generate a broader and more secure understanding of the research issues.

Triangulation of different methods not only allowed the production of a more complete, holistic, and contextual picture of the SMEs studied but also enabled checking the data

received from various sources and examining it from different perspectives, thus reducing the likelihood of misinterpretation. For example, the central role of the owner-manager in the firm's learning process as claimed by some of the owner-managers we interviewed, was triangulated wherever possible by interviewing a partner representative or other key external actor and through careful analysis of other source materials.

The study involved data collection through multiple sources, combining data from personal interviews with data from an array of other sources including press releases, published news articles, corporate web sites, sector related publications, firms′ directories, product catalogues and available secondary data (see section 4.9 for further discussion). The main objective was, therefore to obtain a depth of focus on the research object. The aim was to collect sufficient information to describe and explain the unique features of each case, as well as to highlight the characteristics common to the overall group of cases. This comparative case study approach also aimed to obtain an integrative perspective of the growth-oriented SMEs studied by drawing the various elements of their process of entrepreneurial learning into a cohesive interpretation. The variety of data sources use across the case studies is shown in the following Table 4.5**Erro! A origem da referência não foi encontrada.**.

Table 4.5 Data sources

Firm	Key informants	Secondary data sources
YDreams	CEO – interviewed in 2009/11/05 and 2011/12/09; Director of Luxury Products of L'Oreal Portugal (a firm's client), interviewed in 2012/02/24.	Across all cases: press releases; firms' news; published articles; corporate web sites; magazines (e.g. from the sector association); statistical data; firms' directories; product catalogues;
Biotecnol	CFO, interviewed in 2010/03/04 and 2011/01/27; Managing Director of Pharmis (a firm's supplier), interviewed in 2012/02/03.	
Bioalvo	CEO, interviewed in 2010/04/18 and 2011/12/02.	
Altitude	CEO, interviewed in 2010/02/18 and 2011/12/09.	
NFive	CEO, interviewed in 2010/04/19 and 2011/12/16; CEO of Strike (a firm's partner), interviewed in 2012/02/15.	
Pelcor	CFO, interviewed in 2010/04/11; CEO, interviewed in 2011/12/28; President of Portuguese Cork Association (APKOR), Interviewed in 2013/05/08.	
Moldene	CEO, interviewed in 2010/12/16 and 2012/01/26; President of the Portuguese Association for the Mould Industry (CEFAMOL), Interviewed in 2013/01/24.	
SOMarques	CEO, interviewed in 2010/12/20 and 2011/12/14; Sales manager from a firm's supplier of soles, interviewed in 2013/01/07; President of the Association for the Footwear Industry (APICCAPS), interviewed in 2013/07/22.	
SMV	CFO, interviewed in 2010/12/29; CEO, interviewed in 2011/12/07	

Qualitative interviews were chosen as the primary methods of data collection, given their ability to probe and bring in-depth insights to events and to track learning processes and patterns over time. Such methodological choices partly rely on the

characteristics of the research site. GOFs in Portugal rely heavily upon the role of their pivotal owner-managers. These constituted key respondents in this study and are best accessed via interviews.

Data collected from the individual owner-manager needed to be triangulated with additional interviews with other actors. Although some external actors were interviewed, the methodology evolved towards a stronger focus on the owner-manager. This happened due to several reasons: because they were key respondents, the most accessible during the study and were often the only actor who had been present at all stages in the development of the firm (being frequently the firm founder). Also, the large number of case studies covered in the study involved a trade-off in the depth which individual cases could be examined. In this way the research moved towards a stronger focus on the role of the owner-manager and processes of entrepreneurial learning than had been originally expected.

4.8. Semi-structured interview

Semi-structured interviews were adopted and the topic guide centred on decisions and actions taken over time and related to contextual episodes (Cope, 2003). This provided the owner–managers' historical perspective of the learning process; how entrepreneurs and firms adapted to change and what values guided these decisions. It focused directly on the case study topic and provided insights into causal inferences. Interviews were audio taped when allowed and later transcribed as soon as possible to produce a more accurate record and monitor the development of the project (Miles and Huberman, 1994).

Owner-managers were interviewed first, given their centred role and, from here, it was decided which other people should be interviewed. The owner-manager was considered therefore both a respondent and an informant of other relevant sources of contrary or corroboratory evidence. The triangulation of data was useful because even if it did not always lead to consistent findings, it led to a better understanding or to new questions that could be answered by later research.

There is no way to mechanically 'convert' research questions into interview questions and other relevant methods. Research questions formulate what broad understanding is sought, with specific interview questions being designed to gain that understanding

from interviewees (Maxwell, 2005). The adopted interview topic guide was therefore designed to generate insights into the research questions, and to be unambiguous to respondents.

The interview topic guide was designed to be administrated in a face-to-face interview. Although intended to pursue a consistent line of inquiry, the sequence of questions was designed to be fluid rather than rigid. In other words, it intends both to fulfil the needs of the line of inquiry and put 'nonthreatening' questions. It was also designed to help elicit information from face-to-face interaction and was thus semi structured in order to facilitate flexible inquiry (see Appendix i and Appendix ii).

The interview topic guide was subject to a pilot test in order to identify unproductive or inappropriate questions and to reduce other possible bias, and inaccuracies due to the poor formulation or lack of focus to the questions. The interviewer was therefore able to probe both the 'how' and 'why' of learning and growth processes. The resulting verbal data were supplemented with other sources, including documentary evidence (Yin, 2003) where possible.

Owner-managers were formally interviewed twice during the data collection, and each interview lasted from one to two hours. The first interviews unveiled substantial inferences which were examined and corroborated in further interviews. Repeated interviews allowed changes to be tracked over time, such as major strategic decisions from which had resulted important learning outcomes. They also allowed the corroboration of data from previous interviews.

Owner-managers were informed about the need for them to be interviewed over a two year period, and were asked to provide their cooperation. The schedule for these interviews was made in advance and according to respondents' availability, so as not to interfere with their daily activity. The first case to be approached helped to refine data collection plans regarding both the content of the data and procedures to be followed.

4.9. Secondary data sources

Press releases, firms' news, internal written documents, published articles, corporate web sites and other sources contributed to data collection, as well as other documentary data obtained through contacts with customers, suppliers, partners, or service supporters

(see Table 4.5**Erro! A origem da referência não foi encontrada.**). Documents were used to corroborate evidence from other sources and as inferences to further inquiry (Yin, 2003).

These sources of evidence are exact and stable and can be reviewed repeatedly. The study of documents was extremely useful in formulating interview questions and testing the information mentioned in interviews. However, there were also constraints as for example where access was restricted to preserve confidentiality. Occasionally, the provision of some important additional information which was agreed at the end of the interview (e.g. consultancy studies upon the company) was never provided, despite the recurrent insistence by email. Significantly, the owner-managers generally preferred to limit information provision to that which was already in the public domain (e.g. product catalogues), in order to preserve business confidentiality. Moreover, documents found in the chosen study objects were produced with different objectives other's than the present study (e.g. product catalogues aim at marketing efforts rather than academic purposes). Nevertheless, this documentation was useful to produce inferences and corroborate other data (Yin, 2003).

4.10. Data analysis

Each interview was transcribed and constituted a 'single study' with its own conclusions based on its own facts and its interpretation. Further, the cases were analysed following a rationale of replication. Generalization resulted from the potential correspondence between case conclusions and theory (Miles and Huberman, 1994) from a data-theory interaction process. The research attempted to isolate causal connections by a process of analytical abstraction through which the researcher condensed more and more coherent understanding of the phenomena, progressing from the specific happening to formalization of key variables within a model (Miles and Huberman, 1994).

4.10.1. Single-Case Analysis

At first descriptive analysis was attempted: tentative ideas about categories and relationships were written in notes from reading field notes and listening to interview audiotapes. Analysis and coding of transcribed interviews took place as soon as transcriptions were available. Coding sought to 'fracture' the data and rearrange them

into categories that facilitated comparisons between things of the same category and help in the development of theoretical concepts (Maxwell, 2005). This coding and categorisation helped in interpreting the data and in relating it to the initial research questions and framework.

Coding was done using codes from a 'start list' of theoretical categories generated from previous studies (Miles and Huberman, 1994); and generated substantive codes, which emerged from the interviewees' accounts of what was going on. Further interviews were reread specifically for codes which had emerged from previous interviews. As patterns or themes were identified, recoding was carried out accompanying the development of dimensions of a given theme (Maxwell, 2005). For example, under the category *'learning triggers'* a set of codes emerged such as '*lack of business knowledge*' or '*lack of regional network*'. Although the codes were labelled with abbreviations to facilitate access, they were also illustrated numerically to frame several text segments (see example in Appendix ii).

The analysis relied on the comparison between empirical evidence and previous categories of known relevant literature and themes were identified openly from data, as well. The analytical framework was developed before, during and after data collection (Easterby-Smith et al., 2008). This involved constant judgments by the researcher with respect to which data were selected and presented in order to tell a story that was coherent and faithful to the observed phenomena (Stake, 1995).

Different sources of information, principally from interviews with owner-managers and external actors (e.g. the president of sector associations), firms' websites and product catalogues provided in interviews, were triangulated. Matrices were constructed from the data and used to identify patterns, comparisons and trends arisen from different sources of information. Further questions and possible routes of inquiry were devised to answer the questions which emerged from the matrices. At this point, it became evident that the owner-managers' meanings prevailed over other sources of information because they were the key respondents, the more accessible, the more present over the firms' development and, because they would not approve the conduct of any further interviews with their employees. As a result, the research changed towards a greater focus upon entrepreneurial learning.

Finally, interview summaries were written to help to identify common threads and useful quotes, used as examples in writing up the research. A compilation of quotes is useful to appreciate contrasts and similarities (Maxwell, 2005).

In the current research, within case analysis was carried out for a single firm through content analysis matrices that categorize processes and outcomes. These tables were built for three themes:

- Knowledge base, learning triggers, and responses;
- Learning processes;
- Learning outcomes

The different elements of the learning process were categorized into seven factors building on the Cohen and Levinthal's (1990) concept of absorptive capacity, Zhang et al.'s (2006) organisational learning framework, and Abdelgawad et al.'s (2013) concept of entrepreneurial capability.

Table 4.6 Elements of learning process

Factors of the model	Definition
Knowledge base	Early knowledge, which influences absorptive capacity and learning orientations;
Knowledge type	Business knowledge: the specific market and institutional knowledge of a business; R&D knowledge: the specific knowledge to research and develop products and services;
Learning triggers	Contextual events that stimulate learning, such as competition or a crisis.
Learning modes	The way knowledge is acquired, either more experiential and exploitative ('by doing'), or explorative (e.g. planning, networking, searching, imitating);
Learning scope	The knowledge sharing that can be individual (e.g. owner-manager, CEO), group (e.g. owner-managers' team), intra-organisational (firm) or inter-organisational (e.g. partnerships);
Learning outcomes	Capabilities and competitive advantage that result from the learning process;
Entrepreneurial capability	A firm's capacity to sense, select, and shape opportunities, and coordinate their strategic moves and resources in exploration of these opportunities;

4.10.2. Cross-Case Analysis

Single case analysis was followed by cross-case analysis to compare data between cases (Yin, 2003). Dimensions emerging from theory and analysis allowed the identification of similarities and differences between cases; and different information from different sources was compared to reinforce conclusions (Eisenhardt, 1989).

The developed conceptual framework breaks down the main themes into factors, while the cross-case matrices facilitated the identification of patterns and the related variables involved (Miles and Huberman, 1994). During the cross case analysis high technology

ventures and traditional manufacturing firms were identified as having different learning behaviours. Then, cross case matrices were built to better outline these patterns, in which their characteristics, relations and outcomes were discussed and displayed across the groups of firms (e.g. Table 6.1). Additional cross group matrices were developed on the major themes (e.g. Table 6.8). The data were aggregated and repackaged through identifying relationships and aiming at an explanation. Contrasting finding and similarities were sought between high technology and manufacturing firms in terms of their environmental triggers, learning processes and outcomes.

4.11. Validity

The test of quality of any research is the extent to which its conclusions can be generalized convincingly to any wider audience and fellow researcher (Curran and Blackburn, 2001). Therefore, the conduct of case studies must follow procedures that ensure the quality of written up research. Validity is about the credibility of research, and the extent to which the strategies and methods accurately assess the phenomena involved (Maxwell, 2005), and it is enhanced through emergent relationships (Miles and Huberman, 1994).

This study follows the validity criteria suggested by Miles and Huberman (1994) and Yin (2003): construct validity – the extent to which measurement questions actually measure the presence of the studied concepts; internal validity – to set causal relationships and determine what alternative explanations can be eliminated; external validity – the extent to which the results can be generalized to other relevant contexts; reliability – to ensure the operations within the case study can be repeated with the same results. To achieve this, several steps were followed (see Table 4.7):

Table 4.7 Validity mechanisms of case study

Tests	Methods
Construct Validity	Use of different sources of information; the statement of the problem and main concepts are set out; theoretical representativeness of cases is set; a chain of evidence is set;
Internal Validity	Identification of case patterns; explanation of identified relationships; identify and report discrepant evidence;
External Validity	Replication to all cases;
Reliability	Use of a case study protocol; store all information about cases – notes, documents - in a case study database and compare it.

Triangulation of different sources of information was followed. Such diversity provides richer data and reinforces evidence about the relationships between contextual learning stimuli and organisational learning. For example, public information on the firms was analysed in the light of the already codified data to triangulate different sources of information.

A chain of evidence was developed. Beginning with the literature review, and proceeding through problem statement and identification of main concepts to produce a set of research questions that guided data collection and analysis. Such guidance reinforced the reliability of the information. In addition, because it is based on a 'start list' of existing dimensions from previous studies, construct validity and internal validity were reinforced. Finally, a case study protocol was set (Yin, 2003), which included the research tools, rules and procedures to be followed during the investigation (see Table 4.8).

Table 4.8 Case study protocol

Phase	Procedures	Criteria
Research Site Selection	Criteria definition	SMEs that exhibit growth that is more than 20% above the industry average over the three preceding years or more than 25% yearly (in the absence of industry statistics);
		To be a privately owned SME;
	Access to cases	Address the owner-manager through email and phone and explain them the purpose of the investigation;
		Scheduling interviews with owner-managers;
Sources of information	Diverse sources and respondents in order to triangulate them	Request additional corporate documentation if necessary to complement available public information;
		Exhaustive search on media about firms' related news;
		Research on the selected firms web sites and others' related partners, suppliers or customers;
		Use of thematic and generalist internet search engines;
		Analyse corporate products;
		Interviews with owner-managers and other relevant industry actors as identified through preliminary interviews;
Data Collection	Set a time schedule	Data collection carried on from 2007 to 2014;
		Interviews took place from 2009 to 2013;
Data coding	Coding	The identification of a previous 'start list' of existent codes makes it easier to compare cases by categorizing analysis;
		Coding eases further categorizing and connecting analysis;
Data analysis	Guided by literature	A categorical and connecting analysis of the learning processes in the light of context learning stimulus;

4.12. Ethical Issues

This research raised some ethical concerns in order to ensure that the participants were approached with discretion and in no way affected for instance in terms of their professional and personal status. This was partly guaranteed by following Middlesex University's regulations and guidelines for conducting ethical research and by obtaining approval from the Business School's Ethics Committee.

- Permission was gained to identify the case study firms by their proper names within the thesis;
- Free choice of participants and their points of view were respected;
- Taking sides with people in the business or getting involved in internal debates was avoided;
- Comments that disagreed with the researcher's interpretation of events were respected, and moral or ethical opinions were avoided;
- An open and reciprocal relationship between researcher and organisations was attempted;
- The empirical work in the field was always subject to the owner-manager and other relevant parties timing needs so as not to annoy people or disturb organisational daily activity;
- Any publication will be forwarded to the participant organisations prior to publication, so as to avoid factual errors and ensure that no information of value to competitors is divulged;
- Information commonly agreed not to be published was not used publicly;
- Known sensitive issues (e.g. finance) were treated with discretion;
- All duplicated research materials were stored in a locked location to respect confidentiality. Such data were only made available to researcher and

supervisors involved in the project. Requests for access were considered on a case by case basis and under consent of interested individuals.

4.13. Conclusions

The research design described in this chapter was designed to accomplish the research goals. This included electing to take a comparative case study approach and to develop an interview guide which was applied to the owner-managers plus a number of key other actors across a sample of nine selected firm cases. The case study method allowed for systematic analysis and augmented confidence in the findings. This approach was particularly useful for responding to *how* and *why* questions about a set of events (Miles and Huberman 1994).

As part of the process, proposed methods changed as firms were approached and difficulties arose. First, it had been intended to negotiate with the owner-managers over the use of a diary log in which they would write down relevant events to ease tracking responses to major learning triggers. However it rapidly became apparent that no owner-manager was willing to cooperate in the use of such a data collection tool, and this was dropped entirely from the research method. Second, it was intended to interview internal actors other than the owner-managers to gain different viewpoints over how learning processes within firms developed as well as to corroborate the owner-managers' statements and increase the data robustness. Such initial goals however were unfeasible as the owner-managers didn't trust the researcher to question their employees.

A limited number of actors who interacted with the firm as suppliers, clients or partners were interviewed when allowed and this did provide useful complementary insights into the owner-managers' statements. Despite the original intention of exploring organisational learning from multiple perspectives, actually, the methodology shifted towards a stronger focus on the owner-managers' accounts. This methodological change resulted in an increased emphasis on the nature of entrepreneurial learning and its relationship to wider processes of organisational learning in response to diverse critical events.

In general, the owner-managers showed a high degree of co-operation with the study and made a valuable contribution to the research by agreeing to two in-depth interviews

over a two year period, although they acted to restrict the focus of the research. The second phase of qualitative interviews was an opportunity for the researcher to clarify important issues for the understanding of the whole analysis. These valuable oral data were complemented with other written data sources available on firms' sites and websites.

Limitations of the research related to the limited validity and generalizability of the findings. However, the main aim of the study was to gain an understanding of the complexity of the research problem. The analysis followed an increasing process of analytical abstraction that begun with creating the text to work on, trying and coding categories to find a set that fitted (see Appendix ii), identifying major themes, and finally focusing the analysis and reporting around these themes. The results of this analytical process are set out in detail in the next chapters five and six.

5. Chapter Five: Learning in growth-oriented Portuguese SMEs: within case analysis

5.1. Introduction

This chapter examines the individual cases in relation to the research questions, focusing on the firms' early foundational knowledge base, critical factors that have triggered learning and the resulting processes and outcomes at the firm level. The chapter seeks to describe and explain learning processes over time through content analysis of the case study data, including the use of tables and matrices, following the method suggested by Miles and Huberman (1994).

As explained in the preceding chapter, an important criterion for selecting the nine cases was that they were all experiencing high rates of growth at the beginning of the study and had achieved this, in part at least, through their strong orientation toward innovation. From here, the themes to be investigated were identified in the light of the literature discussed in Chapter 2, which in turn, was reflected in the interview questions (Appendix i).

The main themes explored in the interviews with owner-managers related to their roles in relation to: (a) the firm's early knowledge base (i.e. at the start-up and immediate post star-up phase), learning triggers and responses; (b) the type of knowledge accumulated and learning processes involved; (c) learning outcomes. The goal was to explore the basis on which growth-oriented SMEs were able to respond to and learn from events affecting their operations and markets in order to be successful. Interview data and their meaning were analysed, firstly through the interview transcript, secondly through thematic analysis, and finally through categorical content analysis (Appendix ii).

Interview transcripts were edited; themes within them were identified, and then sorted by category. Categories were derived with the main research questions in mind, in turn reflecting the interview questions. Each case study is explained with reference to the three themes identified:

a) Early knowledge base, learning triggers and responses

This section describes the company's initial knowledge base and its evolution over the study, drawing mainly from the narrative provided by the owners/founders. According to Cohen and Levinthal (1990), the knowledge base of new firms plays a key role in how they respond to contextual triggering events and their learning processes over time.

The section also examines the challenges that firms faced as revealed in the interviews, and how they responded to triggering events. A notable theme that emerged from the interviews was how critical learning events often triggered higher level learning and subsequent reconfiguring of organisational capabilities.

b) Knowledge types and learning processes

This second main theme relates to the knowledge types and learning modes and scope demonstrated by firms when coping with external events, focusing on business and R&D knowledge. Business knowledge is defined as market and institutional knowledge pertaining to a business, at either the domestic or international level, including, for example, knowledge of sales operations or partnership procedures. R&D knowledge is the product-specific knowledge and technological know-how needed to develop new or improved products and services. This can include, for instance, knowledge about manufacturing processes and the provision of support services.

The section also includes an analysis of how new knowledge was acquired by firms in terms of the learning modes while sensing, selecting and shaping opportunities. A broad spectrum of potential learning modes is suggested in the literature (Zahra et al., 2006; Huber, 1991; March, 1991), ranging from unplanned to systematized, or from exploitative to more explorative. If learning derives from direct experience and internal routines are established 'by doing', it is considered here as *low level* or *exploitative learning*. This occurs when relatively minor (or incremental) adjustments are made to existing procedures, typically because a particular situation has been encountered and dealt with in a similar way in the past[9].

Conversely, *high level* or *explorative learning* is defined here in terms of combinations of new non-routine knowledge aimed at doing significantly new things, including as a

[9] As also reflected in Argyris and Schon's conception of single loop learning (1978).

result of the critical scrutiny of existing procedures with an eye toward change[10]. Such high level learning is characterised by the exploration of novelty, openness to external knowledge, influences and potential partnerships (as suggested by the concept of 'open innovation'). This is often a result of external contacts and networking, imitating, improvising, training, experimenting through trial and error, 'grafting' (i.e. hiring external staff or acquisition of another enterprise), or even as a result of planning that draws heavily upon external information. High level learning can also involve 'learning how to learn'[11], in reflecting on how to learn better and to renew existing capabilities through strategic change and accessing up-to-date knowledge. Finally, this section also explores the *scope* of the specific learning processes involved, whether at the individual, team, organisational or inter-organisational innovation levels.

c) Learning outcomes

The research examined the outcomes of firms' learning in terms of the acquisition and combination of new capabilities and how these have contributed to their competitive advantages. The role of capabilities is considered in terms of the Penrosian theory of the growth of the firm (Penrose, 1959), which places considerable emphasis on the importance of learning capabilities and firm's characteristic strengths as a source of competitive advantage. A capability is considered to be the capacity for a number of resources (e.g. knowledge) or other capabilities to be effectively combined within the firm. In particular, entrepreneurial capability is here deemed to comprise the combination of capabilities that allow firms to gain competitive advantage and to grow. This includes the sensing of possibilities (e.g. by seeking), selecting new insights and planning, shaping opportunities (e.g. by a new recombination of existing resources / capabilities into a distinct product), and synchronizing internal and external resources for the exploration / exploitation of those opportunities over time (e.g. by continuous sensing of up-to-date external knowledge) (Abdelgawad et al., 2013).

This chapter examines firms' knowledge base, knowledge type, and learning processes in relation to the learning outcomes within each case study. This analysis then provides the basis for the cross case analysis, reported in Chapter 6. Each case study is described, analysed, and explained in relation to the main research questions.

[10] This takes place when explorative situations reveal the inadequacy of existing '*theory in use'* (Argyris and Schon, 1978), calling into question the appropriateness of existing procedures.
[11] This is similar to Argyris and Schon's concept of *deutero* learning (1978).

5.2. YDREAMS

5.2.1. Introduction

YDreams specialises in software for the computer games and virtual marketing industries. It was founded in 2000 by its current chairman, António Câmara, and four former colleagues from a research lab in New Lisbon University's Faculty of Science and Technology, in Monte da Caparica, the Great Lisbon Area, Portugal. In 2013 YDreams employed around 120 people and had its headquarters in the US with global offices in Barcelona, São Paulo, Rio de Janeiro and New York.

In recent years it has developed full-scale interactive environments and products, and building up its intellectual property in the area of interactive technology and design. It has researched and developed proprietary/patented technologies in areas such as image processing, augmented reality and gesture-based interfaces with application in a range of projects and products. Indeed, it has developed over 500 projects for global clients in three main strategic areas: Projects, Products and R&D.

YDreams Life (projects) worked on the conception of interactive architecture, creating interaction experiences for accessing content that is based on intuitive touch (e.g. for museums)[12]. Finally, in-house proprietary technology grounded upon YLabs, was the core of the company and worked independently from its commercial units, in areas such as augmented reality or image processing, developing the firm's proprietary platform software. The important critical events in the company's history are summarised below:

- 2001: started developing location-based gaming technology, releasing its first mobile game in 2002;
- 2003: took the first steps in augmented reality software;
- 2004: commenced its international expansion with one co-founder, relocating to Barcelona to open YDreams Med;
- 2006: raised 8.5 million Euros in venture capital from ES Tech Ventures and the North American firm Herrick Partners and started operating in Brazil;

[12] A product such as Architek – the Interactive Solutions Creator - was designed to create interactive applications, such as interactive floor projections, by which the final user may customize all contents.

- 2007: opened an Office in Austin, Texas (US);
- 2008: created an entrepreneurial network for developing revolutionary products conjointly with the AR Consortium[13] and joined with a North American partner to found the New York-based Audience Entertainment[14];
- 2010: created a spin-out company, the Ynvisible, which focused on the development of new technologies in printed electronics;
- 2011: created two more spin-out companies: YVision, whose focus was Natural User Interfaces (NUI), developing and producing Software Development Kits (SDK) that enabled engaging the NUI applications, and YDRobotics, specializing in robotics;
- 2013: developed another spin-out, the Azorean, which focused on developing drones to explore the deep sea.[15]

5.2.2. Early knowledge base, learning triggers and learning responses

Knowledge base

The firm's knowledge base was largely founded on the owner-manager's strong academic background in software platforms (Table 5.1). Prior to establishing YDreams he had spent several years abroad and built a solid international and informal network of contacts in the software industry[16]. These contacts were a critical resource that the owner-manager has been able to draw upon in setting strategic directions, organizing spin-outs world-wide and diversifying to R&D related businesses/spin-outs, while maintaining the core R&D capabilities of the firm. The core R&D team, made up of engineers from the Institute for ICT engineering (INESC[17]) was considered a core capability and kept almost unchanged during this time.

[13] A group of global companies that are pioneers in the development and creation of augmented reality technology and tools.
[14] A global company that creates and commercializes audience games for grand-scale venues.
[15] Ydreams Informática SA - Corporate Information (2013).
[16] E.g. through participating in projects at Virginia Tech University and MIT (Massachusetts Institute of Technology) that he has used from the beginning.
[17] A private association based in Lisbon, with a mission to research, educate and advise on ICT related issues.

The firm's lack of in-house business knowledge was an early key weakness of YDreams, attributable to the fact that both the owner-manager and his core R&D team were technical specialists and lacked requisite managerial/business knowledge and experience. This constraint was addressed earlier by drawing on expertise available through the firm's external alliances and consulting sources: *"All the managers were researchers … and we did not know anything about management. Then we talked with some people who told us to think of a new product, get the necessary investment, and focus on the potential market" (*YDreams, owner-manager). First, the firm attained prestigious partnerships in relevant business developments[18]and second, as the partnerships evolved, it specialized in different market segments through spinning off, in order to gain proximity to key markets. By 2012, as a result, the company had developed a much stronger business capability, which further facilitated its growth, international business development and attracted investors to the board of the firm.

Learning triggers and responses

In the beginning, difficulties experienced in developing a supportive domestic network, accessing finance and disappointments related to attempts to access public support[19] compelled the firm to internationalise while relying heavily on its own internal resources (see Table 5.1). Government regulation regarding patenting was experienced as overly bureaucratic and time consuming, impeding their ability to introduce new products. Simultaneously, the lack of local marketing expertise and prestigious global partnerships were experienced as major obstacles to effective promotion of their products abroad (section 3.4): *"Portugal is a disaster regarding marketing and sales, and mostly in potential partnerships … there is no enterprise on a par with our business with its headquarters in Portugal*" (YDreams, owner-manager).

[18] Conjoint product development in the long term with large companies such as Dell and Hewlett Packard.
[19] For example in relation to ensuring bank credit, which was very demanding in terms of the guarantees required and also public payments, being very delayed.

Table 5.1 YDREAMS' knowledge base, learning triggers and learning responses

Knowledge base	Constraints experienced	Responses
Owner-managers' knowledge in software platforms acquired through academic research (PhD) and previous international academic networking (2000)	Lack of finance; Lack of domestic partnerships and public support; Bureaucracy in implementing financing aid;	Increase internationalization (2004);
	Lack of international business knowledge	Hire international business knowledge (2007)
	Internal climate deteriorated; Unpaid wages; Lack of investment in marketing;	New investments in a new business /prestigious partnership (2008); Outsource marketing efforts to partners (2008);
Knowledge on business partnerships through international networking and spinouts (2012)	Domestic trouble in getting paid; Competitive intensity; Global crisis and lack of confidence; Vertical integrated markets;	Spinning out five ventures (2008-2013); Reduce staff (2009); Business diversification (2009); Create global products with leading partners (2008); Successful distinct product (2011). Move headquarters to USA (2011);

ICT firms, being highly market focused and aiming at a customised product, tend to seek and build close collaborative relationships with key partner / client firms, often at a global level. Furthermore, ICT firms tend to interact collaboratively with partner / client firms with whom they engage for purposes of conducting 'open innovation'. YDreams therefore chose to internationalize further by developing alliances with well-known international firms. It thus acquired business knowledge of the markets it was seeking to penetrate and developed a strong reputation within the sector, which was critical to attracting important new investors. It also recruited external expertise in the form of a business developer with experience in one of the major overseas markets (the US). Later, such recruitment proved insufficient in the face of the domestic constraints previously described. Also the growing economic crisis further aggravated a poor domestic environment characterised by lack of confidence, bank retraction and deleverage. The company continued to struggle to enhance its intellectual property, brands and reputation in its target markets.

From 2007/2008 onwards, the firm's continued poor performance (i.e. in terms of growth/profitability) was further compounded by the impact of the world economic crisis. A key characteristic of the ICT sector shows a strong link between process technology, product technology, and product characteristics that leads towards integration (e.g. the convergence of computing and entertainment technologies), with the ICT products becoming part of broader integrated systems. Specifically, the vertical integration in the computer games and virtual marketing sectors continued to grow (with increasing acquisitions and merges), as shareholders' confidence deteriorated and it became increasingly difficult to collect domestic payments. YDreams addressed these constraints by diversifying to new businesses, and developing relationships with prestigious international partners. In 2011, YDreams relocated its headquarters to the US in a bid to improve its reputation in this key market. Nonetheless, the worsening global economic environment resulted in a drop in sales, with knock-on effects on the firm's internal climate to some extent, with the need for layoffs. In response, the firm announced new investments, new key partnerships and boosted its marketing efforts to recover its reputation.

As the company sought to strengthen its business knowledge and develop new client and partner relationships, it spun off five related ventures during 2011/12 and diversified to different businesses in order to encourage complementary competences and strengthen its product. This restructuring involved laying off entire teams, some of whom went on to create closely-related and competing start-up firms in the vicinity.

5.2.3. Learning processes

Table 5.2 summarises the principal learning processes (in bold) identified in this firm. YDreams demonstrated high learning intensity through a combination of several learning modes, namely exploitatively, 'by doing' and by explorative networking, searching new business opportunities, planning business goals and improvising new products and processes. The firm was compelled to learn new routines frequently along its life cycle, but only rarely having recourse to 'grafting' external expertise and the imitation of others' practices. It continuously reconfigured its distinct capabilities in different products by proactively integrating external knowledge in its R&D units through international partnership, spinning out and relocation, with the owner-manager being central in sensing relevant knowledge and selecting opportunities.

Internally, the company accorded particular priority to protecting and nurturing its R&D knowledge and R&D department that were considered the *"backbone of most of YDreams technologies*"[20]. Its core technology of augmented reality software supported its businesses and R&D department. The YLabs department tended to rely on existing in-house knowledge and developed the firm's proprietary platform software by its own means, 'by doing': The "*main source of knowledge starts internally, with people presenting immense creativity, crafted by the experience they have."* (YDreams, owner-manager). Incremental innovation happened at R&D level, through an exploitative learning around existing core technologies.

Externally, other learning modes were crucial to absorb external knowledge. The company became increasingly internationalized by networking with partners and clients and searching new clients, first by distance networking and second, by moving its headquarters abroad and spinning off. Since start up, such inter-organisational learning was very intense,[21] constantly changing internal procedures: "*partnership was very close, through a permanent interaction, very R&D centred and focused on newness"* (L'Oreal[22]). YDreams engaged by networking in prestigious long-term alliances (e.g. Dell, Microsoft) and added new external knowledge to that previously obtained by listening to important players (e.g. the former CEO of a Bank).

In this way, the firm's reputation and trust were increased, enabling the acquisition of international business knowledge and closeness to crucial markets (e.g. the US market, with a vast client and partnership potential to explore). Consequently, this promoted strategic planning at an international level, led to the creation of a number of spin-offs and increased the influx of consultancy advice and investment (e.g. from Netscape, Lloyds, or Apple). Frequently, and whenever necessary, the company improvised new products and processes through sporadic 'brainstorming' sessions to change plans rapidly [23], in which decisions were taken after collective discussion, involving both business managers and R&D staff, who exchange knowledge.

In its inter-organizational learning at international level, the firm was compelled to 'graft' (recruit) external business managers to fulfil its lack of business knowledge and

[20] YDreams Informática SA - Corporate Information (2013).
[21] The firm counted more than 80 meetings with US firms in several conjoint and long-term projects.
[22] Interview with Rosario Costa, Director of Luxury Products of L'Oreal Portugal, a firm's client in February 24st 2012.
[23] E.g. Improvising in contracts already formed that had to stop because they were unveiled as not viable.

reputation in foreign markets. These external business managers (e.g. including a Finnish manager from Nokia) provided some increased networking capacity, temporarily enabling the company to access business knowledge and diminished the marketing-related constraints posed by location. However, with the growing recognition of the difficulty of managing and promoting its growing international activity from a peripheral location like Portugal, the firm decided to move abroad. Closeness was crucial in dealing with distant clients and partners, who demanded continuous collaboration.[24] Also, the company on occasions selectively imitated some of the successful practices of other competitors, with a history very similar to YDreams.[25]

Table 5.2 YDREAMS Learning processes

Learning modes	Knowledge	Learning scope
'by doing'	**R&D, Business**	**Team, owner-manager**
Networking	**R&D, Business**	**Owner-manager and other actors**
Searching	**R&D, Business**	**Owner-manager**
Planning	**R&D, Business**	**Owner-manager, partners, managers, and technologists**
Improvisation	**R&D, Business**	**Owner-manager and technologists**
Learning to learn	**R&D, Business**	**Owner-manager and team**
'Grafting'	Business	Owner-manager and other actors
Imitation	R&D, Business	Owner-manager

Frequently occurring (bold) and occasional learning processes

YDreams ability to learn, adjust and synchronize internal and external resources was evident in the way it was able to modify its structure and business goals, such as when it moved its headquarters to the US or developed new spin off companies. Each time it carried out these structural and strategic changes, the company had to change critical procedures, reconfigure basic assumptions and how it approached the learning of new routines, and significantly reformulate its activities in the pursuit of the more profitable business opportunities. This included, for instance, redesigning staff positions, abandoning developed products, making radical shifts, such as quitting the environment and entertainment businesses to focus on culture and advertising; hiring external

[24] Partnerships and service level to the clients were of a high level of technical sophistication. Audience Entertainment, for example, resulted from a YDreams partnership with a North American partner, in that a close planning of product development was necessary from the beginning.

[25] It imitated the practices of firms such as Apple, Dell, IDO, and Hewlett Packard in functional areas related to industrial design, human-resource management, growth strategy and product development.

management, founding new branches and creating spin-outs such as the Azorean, to develop remote-controlled drones to explore the deep sea.

The owner-manager served as a bridge between the external business and internal R&D knowledge that creatively emerged from the R&D team. He participated in internal general meetings and 'brainstorming' sessions, in which knowledge dissemination occurred by planning and improvisation. This allowed for the integration of the individual and collective knowledge needed to better shape opportunities. According to the account of the YDreams owner-manager, in the absence of complete business knowledge "*improvisation is 'built in' and comes from me and my co-founders who have such capability"*. New strategic directions were set by reviewing and revising existing plans in the light of the external knowledge and understanding gained from partners and consultants. In the owner-manager's words, "*I only orchestrate and the others play their instruments .... I still lead the entire group ... setting the way to follow ... communicate it and convince people."* (YDreams, owner-manager).

5.2.4. Learning outcomes

Table 5.3 summarises the evidence relating to how YDreams has been able to develop its capabilities and competitive advantage through learning. By external learning, the company achieved new business capabilities for operating internationally in highly demanding markets (e.g. the US), building long-term partnerships, and recruiting competent international staff to work on its behalf (e.g. Nation Cinemedia): "*we were able to reset the firm ... and to restore the initial flexibility by spinning off and acquiring partners that are able to sell for us"* (YDreams, owner-manager).

The resulting inter-organizational learning allowed the company to achieve external complementary capabilities (e.g. marketing and R&D skills from partners) for their R&D to create an original global product and to compete globally and near key markets. For instance, the partnership with Disney increased the firm's global profile and exposure throughout the entire cinema network. A similar situation arose with the Intel group in relation to hardware products. Important partnerships also attracted important

clients and investors to YDreams, who preferred to work with an experienced firm in which they could trust[26].

YDreams also continued to pursue its core R&D, continuously improving its efficiency and simplifying its procedures: "*we intend to keep an integrated perspective at product level ... now we have much more efficiency ... in terms of core competences however, everything remains the same*" (YDreams, owner-manager). This led to efficiency gains through the design of its products and services (e.g. screens, robots, software).

Table 5.3 YDREAMS Learning outcomes

New capabilities	Competitive advantage
Integrative software able to combine synthetic and real information; New international businesses established; Long-term partnerships with large customers/partners established; Ability in recruiting internationally.	Software applications on augmented reality and new interactive surfaces; Products able to integrate different functions / technologies; Specialized spin-outs; Prestigious reputation; Investment capacity; R&D capacity.

Those new capabilities led to competitive advantages that included an integrated vision at product level, diversification capacity through spin-outs (e.g. editorial market with Invisible), and increasing business specialization. The company also attracted additional investment due to its increasing reputation: "*the key word is confidence that we've gained ... we are doing well with several investors*" (YDreams, owner-manager).

5.2.5. Summary

This case presents great diversity on its learning modes and provides a number of key insights. Firstly, it shows how prior R&D knowledge was crucial in providing a basis for further efficiency-related exploitation at the R&D level. The networking undertaken by the owner-manager – both at business and R&D level – and the core R&D team were

[26]E.g. new investment was gained by Invisible from big players – such as Silver Plant Bank, Cemapa, or Grupo CUF – in order to initiate small manufacturing units. Also, Audience Entertainment attained major investment from one of the major studios of Hollywood.

part of the company's knowledge base, which the firm sought to improve by upgrading its capabilities in its core products.

Firstly, the owner-manager played a key role in the firm's learning trajectory and how this was entwined with his own path of entrepreneurial learning. He had a proactive strategic orientation and global vision from the outset. His bold decisions to address key knowledge gaps – by recruiting requisite expertise, spinning out new firms as separate entities, and moving the company's headquarters to a foreign location – all demonstrated that he was proactive and growth orientated. He shared relevant knowledge inter-organisationally through key partnerships, and planned strategically and broadly as well, with external inputs feeding the decision-making process. He also promoted collective learning within the business through planning and less formal activities such as 'brainstorming' meetings, developing a culture of learning in order to shape opportunities.

Secondly, a number of external learning triggers compelled the firm to look beyond the R&D knowledge resources, which provided the basis for its start-up and original competitive advantage. The company was able to improve its performance through international networking at the R&D level, relying on its competent R&D staff. On the other hand, those learning triggers also revealed the difficulty in communicating the firm's ethos and marketing its products abroad and in obtaining domestic partnerships to support this. Moreover, an inter-organizational learning scope at international level and difficulties experienced in relation to Portugal's system of intellectual property protection resulted in the decision to create new spin-out ventures located in relevant overseas markets. Other learning triggers came in the form of intense competition and the ongoing economic crisis, which forced the company to diversify its businesses and internationalize further. The company co-developed its products in partnership through a high 'openness' in terms of innovation procedures. Specifically, the company sought internationally complementary R&D knowledge through networking and spinning out, whilst also acquiring external expertise at the business level. On the other hand, at the same time it continuously improved its in-house core R&D capabilities.

These learning triggers and processes contributed to the nurturing of new product development capabilities in terms of building crucial partnerships and strategic alliances with other international businesses, and recruiting expertise internationally. It was the

firm's commitment to continuous R&D-based improvement within its specialised niches, while developing long-term partnerships and reputational effects, that strengthened its resource base and current competitive advantage. Its entrepreneurial capability, which mainly centred on the CEO's leadership and coordination capacity, is reflected in how it has been able to apply its business capability to overcome the domestic constraints faced, while also combining internal core R&D capabilities with external technology to achieve global and integrative products adapted to suit the needs of clients in various industries.

5.3. BIOTECNOL

5.3.1. Introduction

Biotecnol is a Portuguese research-based biotechnology company that specialises in multi-specific antibody products that target human cancer. Currently, Biotecnol's *Tribord* proprietary platform allows the generation of multi-specific antibody products and combines different antibody fragments. It owns and exploits the exclusive rights of this proprietary technology.

The company was initially headquartered in Oeiras, Greater Lisbon (Portugal) and from 2013 has been located in New Brunswick in the United States. It was founded by Pedro de Noronha Pissarra, the current Chief Executive Officer (CEO)[27], and Andrew Kelly, the chief scientific officer, whose training included various R&D projects[28] and who supervised the firm's research programmes and intellectual property issues. It started with a workforce of just two people in 1998, funded through a combination of private capital (72%) and Portuguese venture capital (28%), and operated as a consultancy services provider to Portuguese pharmaceutical and European biotech companies. Gaining revenues because of the lack of long-term financing sources has always been a concern within the Portuguese context (see section 3.4). The major critical events faced by Biotecnol along its life cycle are as follows:

[27] Noronha Pissarra held an international R&D background (e.g. Massachusetts Institute of Technology, USA) and a Master's Degree in science and technology management.
[28] e.g. European Community ÉCLAIR.

- 2000: it raised its first investment from private shareholders and was able to begin operating independently, which allowed it to evolve into the first pharmaceutical biotech R&D driven company in Portugal.

- 2004: it attained additional financing from its institutional shareholders InovCapital[29], which enabled it to start implementing its current business model and evolve from research toward a product development company that targeted a high-value proprietary pipeline in selected areas of oncology[30].

- 2005: the shareholder, Pharmis[31], entered into the structure of Biotecnol and invested in property rights to develop a biological molecule for cancer treatment[32].

- 2008: Biotecnol ended its public shareholding and established a wholly owned subsidiary, Biotecnol Pharmaceuticals Inc, in Durham, North Carolina, in order to expand its activities into the US[33].

- 2012: the company entered into an important partnership with the pharmaceutical company, Roche, and moved its headquarters to the US.

- 2013: it concentrated its proprietary rights in the US and has delocalized its service providing activity to Portugal through a spin-out, Rodon Biologics. By moving the firm's products to the US it also increased the perception of its value creation and access to investment. The company's core activities were centred on the in-house development of novel biopharmaceuticals, although it also provided process development services for clients.[34]

[29] *InovCapital* (along with *AICEP Capital*) is a state owned venture capital firm created by the Portuguese Government in order to develop and help national companies to grow. It changed its name to Portugal Capital Ventures as of 15/06/2012.

[30] The importance of the oncology market was reinforced by the merging of two major companies in 2009, Roche, and Genentech.

[31] Pharmis is a privately owned pharmaceutical company established in 1991. It has diversified its investments throughout the years, entering into the biotechnology sector and initiating the development of its own pipeline of products.

[32] Such financing rounds came through shareholder loans with high interest rates and to be paid shortly after, that limited severely the company's cash flows. As the cash flow needs persisted, these shareholders soon became creditors, with their loans' interest rate escalating.

[33] The US had a mature market of biotechnology, in where the number of patents filled and investment availability was huge.

[34] The revenues from the services providing have partly funded the development of an internal pipeline of products, based around recombinant antibodies.

5.3.2. Knowledge base, learning triggers and responses

Knowledge base

Table 5.4 summarises the firm's R&D knowledge base. Most of its owner-managers held a PhD in the field, and the firm's experience as a services provider in clinical testing proved to be paramount in achieving R&D experience in international partnerships, enabling the firm to start producing products on its own. The recruitment of a chief financial officer (CFO), who had experience in coping both with the international environment and domestic public shareholders, brought additional business knowledge to the firm. This CFO, who arrived after the start-up, was important in addressing the needs of domestic shareholders and in targeting attractive international markets, and financing sources. His scientific and technical background added to his previous experience in the banking sector and in the Private Equity business combined to optimize Biotecnol's management.

By 2008, the CFO had implemented a new management system that allowed better control over the company's activities, particularly its cash flow, as well as a clearer allocation of each member of staff to each task. As a result, by 2008, the new management team was able to increase the firm's services to third parties and to improve operational results. By 2011, although keeping its services operational to ensure constant cash flows, the company was able to turn its debt into equity[35], and attracted additional North American investment and focused on the *Tribody* proprietary platform[36].

Biotechnology firms tend to be highly reliant on new scientific knowledge, and therefore proximity to medical or other biosciences research facilities is particularly important. Firms in this sector tend be co-located with or close to universities and laboratories for this reason, while also interacting with clients who may be more distant, notably pharmaceutical multinationals. Biotechnology firms are often heavily research intensive, whereas in the ICT sector firms are more involved in close-to-market innovation activity. Biotecnol has, since its inception, been R&D driven, focused on a proprietary product, and has improved its R&D core capabilities through an integrated

[35] Rendering creditors as part of the shareholders' structure.
[36] In spite of the European sovereign debt crisis arrival that reduced the number of contracted projects and forced a new firms' restructuration to maintain the cash inflow.

approach that consolidates its intellectual property position. In 2013, the company attained additional business capabilities by absorbing international business knowledge, by moving to the US and engaging in local partnerships with research centres and hospitals. Also, it was able to secure additional funding through private shareholders, enabling it to continue developing its core product assets in the pre-clinical setting[37].

Table 5.4 BIOTECNOL Knowledge base, learning triggers and responses

Knowledge base	Constraints experienced	Responses
Owner-managers with a PhD and diverse background in research and bank finance (2003);	Lack of national knowledge offer and demand; Excessive bureaucracy in accessing funds;	Take advantage of local R&D staff (1998) Internationalizing by consultancy (2000); Public shareholding (2000)
	Little revenues from services providing	Development of its own quality products (2002);
Business knowledge on accessing partnerships and raising investment (2013)	Lack of domestic long term investment sources; Excessive control from public shareholders; Need of international business knowledge;	Recruiting of a business manager (2008); Regain strategic control (2008); Focus on more attractive international shareholders (2008); Restructuring, new R&D and market flexible approach (2009); Strategic partnerships (2009);
	Competitors delocalisation to lower cost regions	Focus on high standard niches (2010);
	Economic crises	Establish headquarters in US, near investment sources, partners and markets (2012); Spin out a services provider firm in Portugal (2013);

Learning triggers and responses

The product approval process in biotechnology tends to be heavily regulated and product development lead times in application areas such as drug discovery tend to be very long (as much as 10–15 years). In addition to this limitation, amid a general economic crisis, the firm struggled with the domestic constraints of excessive regulation (for instance in relation to accountability rules[38]) and a lack of attractive partnerships

[37] E.g. It raised 20 million dollars investment in 2013, mainly from North American venture capitalists such as JP. Morgan.

[38] Since its start-up, Biotecnol has been required to classify all the expenditures of its activity, including those related with the development of proprietary products, as costs of the year in its financial statements. This situation meant that the pay out of patents was always classified as costs, instead of investment. If it

and appropriate financing (Table 5.4).The legislative framework for regulating patents was experienced as overly bureaucratic, complicating and limiting the relations with public partners, universities and other biotech companies in the region[39].

A potential advantage of the biotechnology sector is that investment in the capabilities and assets necessary to create an effective biotechnology system may be rewarded by high rates of return resulting from the widespread applicability of the technology, including within other sectors.

Portuguese investors, however, tend to be risk-averse and the domestic environment did not present the setting required to develop the capital intensive R&D activity required. Although Portuguese venture capital existed, it was neither sympathetic nor targeted towards the biotechnology sector. Public shareholders were very focused in reducing costs, and unwilling to make long-term investments ('*full burn*' investment): "*it cut off all the financing alternatives in the area of high added value businesses ... the investors invest small amounts, when the money ran out the enterprises ask for more but the investor does not lend it ... and no bank will lend money for a 10 years period*" (Biotecnol, CFO); "*public aid was a barrier as it prevented the firm from applying for international programs"* (Pharmis[40]).

Additionally, there is a tendency towards increased concentration in the biotechnology sector as evidenced, for instance, by the takeover in 2009 of Genentech, the largest of the American new biotechnology firms, by Hoffman La Roche. However, it was problematic to attract foreign investment to Biotecnol: the Portuguese government's credit rating was downgraded to junk status by the international credit rating agencies, and the country had little tradition in the biotechnology sector.

The company responded to those constraints principally by networking and recruiting external expertise. First, given the lack of investment to develop proprietary products in the long-term, it became partly self-financed through selling services to third parties. Second, it attracted relevant expertise that could better communicate the firm's ethos abroad and raise investment: "*The owner-manager has been able to graft expertise at*

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had been considered an intangible asset, Biotecnol would have had better financial year statements and better chances to apply for funding.

[39] Arantes-Oliveira, Nuno, Bioempresas em Portugal (Portuguese Biotechs), Boletim de Biotecnologia, 2013.)

[40] Interview with António Barbosa Pharmis's Managing Director in February 3rd 2012.

the international level by offering them a future shareholding in the firm in order to spare financial resources" (Pharmis). The recruitment of an external financial manager in 2008 was key to overcoming unfavourable public control and boosted the firm's internationalization.

Third, the firm responded by engaging in prestigious partnerships that allowed it to gain awareness and to leverage internal technology through complementary external capabilities, given that applications of process biotechnologies can often be found in a large number of product areas[41]. However, in-house internal core capabilities were still highly protected, including by carefully selecting partnerships in relation to IP and to maximise the reward to shareholders: "*Biotecnol is actively exploring partnering activities that can complement our expertise in biologics product development"* (Biotecnol, CFO).

Finally, new biotech companies need huge amounts of venture capital to pursue R&D and, as the domestic economic crises worsened and venture capital became ever more scarce, the company decided to establish its headquarters in the US, near critical markets and sources of venture capital. In 2013, the company spun out a subsidiary in Portugal, whose mission is to provide services to third parties so that Biotecnol Inc., having moved away from a country in economic crisis, could strictly focus on research and intellectual property[42].

5.3.3. Learning processes

Table 5.5 summarizes how the firm has learned, and the nature of the principal processes involved. R&D and business knowledge were combined in most learning modes. Also, informality and a culture of learning facilitated knowledge flow and exchange and the subsequent realisation of opportunities: "*the meetings are informal and tacit although some are formal and bring together directors and administrative staff*" (Biotecnol, CFO).

[41] The process technologies include classical methods of selection, recombinant DNA techniques, cell fusion, tissue culture, protein engineering, and bioprocessing. Combinations of these technologies may be applied to the research and development of a large number of products such as pharmaceuticals (e.g. insulin, interferon, and vaccines), industrial chemicals (e.g. enzymes, other proteins, and ethanol), and new plant varieties (Arantes-Oliveira, Nuno, Bioempresas em Portugal (Portuguese Biotechs, Boletim de Biotecnologia, 2013).
[42] Biotecnol – Corporate information, 2013

The company was primarily focused on exploiting its core R&D internal capabilities, continuously improving, rather than innovating by creating new opportunities and pursuing novelty. The company learnt principally ed on exploiting its core R&D internal capabilities, continuously improving, rather than innovating by creating new opportunities with partners and clients at international level and planning rigorously its business goals. These main learning modes relate to the need to research, engage in partnership and plan for long term R&D horizons in biotech companies. Biotecnol learns exploitatively 'by doing' while leveraging internal technology and experience: "*we prefer the stability ... our experience is fundamentally d on exploiting its core R&D internal capabilities, continuously improving, rather than innovating by creating new opportuniwledge .... the industry is very strict with regard to routine proceduresr* (Biotecnol, CFO).

In addition, the company learnt by networking with larger influential partner companies (e.g. GSK, Roche), which allowed access to additional capital, findings from associate universities and product applications from different partners. It has achieved knowledge from business partners along the production stream that starts at R&D and ends in the pharmacy[43]. Also the owner-manager performed a key role in searching and identifying a pipeline of potential products that match Biotecnol's R&D capabilities: *"we 'switch on the antenna' and are continually aware of what is going on worldwide"* (Biotecnol, CFO)*; "the firm is constantly aware of what is going on by searching constantly"* (Pharmis).

Planning was paramount because of the importance of the return of investment (ROI) in the long-term. The company planned strategically to anticipate market needs with respect to properly positioning its core *Tribody* technology and to find the right financing[44]: "*we plan proactively ... we plan seriously and we 'don't go with the wind*'' (Biotecnol, owner-manager). Frequently, the firm 'learns to learn' better as when, for example, it was forced to change shareholding, or restructure towards product development, or shift its facilities to the US[45]: "I *would say that we have changed,*

[43] Although the company is inside the process it needed other complementary people and knowledge, such as specialists on formulation and people who know the product such as service providers, suppliers and clients.

[44] The business was moving from pharmaceutical companies to the hospital / medical / doctor areas, towards greater specialisation of clients and investors.

[45] E.g. as when it was decided to turn the firm's debt into equity to face an estimated investment round that did not occur; or the owner manager decided to divide Biotecnol's structure into (1) services

disrupted and restarted ... we had to change radically the procedures ... involving all the staff and with a complete commitment with our strategy … the development has been more through disruption than by evolution." (Biotecnol, CFO).

The company sought and developed new opportunities by both exploiting its internal capabilities and seeking new client industries and new shareholding at the international level, in partnership with large pharmaceuticals. However, some learning modes were less evident. Biotecnol rarely acquired external expertise. The imitation of others' procedures was absent since its initial discover was patented for 20 years and large pharmaceuticals lobby to avoid imitation from generic brands. Also, Biotecnol hardly ever had to learn new procedures by trial and error or improvised new products and processes, because the amounts of investment involved, the accurate planning and highly demanding clients left no room for error at R&D level[46]: "*the history of our lives had a lot to do with our target, with few resources at first*" (Biotecnol, CFO). Finally, the firm preferred to develop additional needed competences through the practices of informal learning by its longstanding team, rather than by formal training.

Table 5.5 BIOTECNOL Learning processes

Learning modes	Knowledge	Learning scope
'by doing'	**R&D, Business**	**Owner-manager and other staff**
Networking	**R&D, business**	**Owner-manager and other actors**
Searching	**R&D, business**	**Owner-manager**
Planning	**R&D, business**	**Owner-manager and other actors**
Learning to learn	R&D, business	Owner-manager and other staff
'Grafting'	Business	Owner-manager and other actors

Frequently occurring (bold) and occasional learning processes

The owner-manager was paramount in terms of co-ordinating the various inputs from different individuals and groups – a function that appears to have been central to the firm's entrepreneurial capability. He played a key role as a knowledge gatekeeper, first in sensing and selecting major opportunities (e.g. attaining international shareholding), and then in shaping it, in linking external and internal knowledge, principally by

providing and (2) development of proprietary products; or to move the headquarters to the US, seeking new investment.

[46] There are exacting plans followed in terms of investment and R&D testing and protocol and the return of investment in the biotech industry in terms of product development takes more than 10 years.

planning at corporate level and learning how to better learn new procedures (Table 5.5 [47]). He has shared knowledge internally, through periodic and informal meetings, and mainly by setting strategic goals: "*the* CEO *is a sort of pivot and also the main person responsible for networking and internationalization"* (Biotecnol, CFO).

5.3.4. Learning outcomes

Table 5.6, shows how the above-discussed learning processes enabled the firm to acquire new capabilities. The company attained strategic flexibility and was able to enter into new businesses in partnership (e.g. Genentech and Roche) in order to license its core technology '*Tribody antibodies*' for distinct malignant cells treatment[48]. The company increased its business knowledge of new markets and investment sources, which led to capabilities in dealing with prestigious international partnerships, meeting market demands and raising important investment: "*the company adds R&D capacity to partners which in turn provides financial capacity (e.g. Spanish pharmaceutics)"* (Pharmis).

The increased specialization on the '*Tribord antibody'* technology (in terms of engineering, industrial processes and clinical tests), resulted in new competitive advantages: "*one of our main assets is the networking we are involved in from the beginning and that grows daily … which makes it easier to do business, getting more reputation, clients, credibility and investors*" (Biotecnol, CFO).

Table 5.6 BIOTECNOL Learning outcomes

New capabilities	Competitive advantage
Strategic flexibility;	Improved international reputation;
New competences on '*Tribody antibodies*';	Strategic diversity;
Increased international networking capacity;	Specialization on '*antibodies*' for cancer and liver diseases;
Increased knowledge on international markets;	Proximity to important US markets.
Increased capacity in raising investment.	

[47] For instance, he was a regular attendee at the JP Morgan Healthcare Conferences, held every year in January in the US and he decided that the Tribody platform should be developed.
[48] By licensing, the developing project is sold to another company, frequently a large pharmaceutical that has the resources to carry on the project while the seller obtains scheduled payments.

5.3.5. Summary

This case study demonstrates the influence of financing constraints in terms of ownership/shareholders on a firm's learning options. The case demonstrated how domestic institutional partnerships affected the firm's international performance through an institutional '*lock in'* that ended up becoming a financial constraint and a barrier to further internationalization. The negative effects of domestic public shareholding were critical in triggering change to fundamental procedures by 'learning how to learn better'.

A lack of effective domestic networks, a collaborative environment and trustworthy institutions were important in boosting further internationalization in terms of proximity to key markets and investment sources. Hence, the firm had to self-finance by service providing, 'grafting' business expertise to access international investment, moving the headquarters to the US, and a spin-out. The company needed to be near critical sources of knowledge support to effectively network with partners and research institutes, thereby reducing uncertainty during innovation. Proximity to critical markets constituted, therefore, a source of the firm's competitive advantage overcoming the Portuguese (peripheral) location, which had been a major barrier to communication and sales.

The case also shows the importance of the firm's knowledge base, at the R&D level, based on a local core staff, and at the business level based on its owner-managers, who addressed domestic constraints and succeeded at the international level. The CEO played a central role in leading the firm's learning behaviour, namely at the business level and in adjusting existing routines in response to critical events, principally through planning and external searching and networking activities. R&D and business knowledge were combined within the organisation, through a highly collaborative team that shared knowledge through informal meetings. The firm's entrepreneurial capability was therefore demonstrated in terms of its internal ability to develop unique bio ingredients able to target distinct industries and generate important sources of investment.

5.4. BIOALVO

5.4.1. Introduction

Bioalvo operates in the biotech industry and was founded as a biotech drug discovery company with its own pipeline of drug treatments for neurological disorders[49]. It was founded in 2005 as a spin-off from Lisbon University (Universidade Nova de Lisboa), supported by two Portuguese venture capital funds, and targeting international markets: "*It was born global, through an international advisory board and clients."* (Bioalvo, CEO [50]).

Bioalvo has benefited since its inception from public investment and European funds (*Quadro de Referência Estratégico Nacional* (QREN) - National Strategic Reference Framework) aimed at supporting biotech innovation. Since its platform technology was patented, the company has licensed it to be replicated in downstream client industries such as diabetes and heart diseases and also provided specialized consultancy services for self-financing. The crucial critical events faced can be summarised as follows:

- 2010: diversified into a new biotech business based on the discovery of new products based on microorganisms from the marine environment, identifying new compounds for different pharmaceutical applications and client industries[51];

- 2011: implemented a strategic repositioning by focusing on its biotech core capabilities in terms of proprietary sea bioactive microbial libraries and patented technology, to maximize its products' applications (e.g. for the *health and beauty* industry);

- 2012: was able to offer a basic ingredient able to meet the demand of large clients. The Global Platform Screening for Drug Discovery (GPSD) platform allows developing experimental tests for the identification of new ingredients (with scientifically validated bioactivity) for a broad range of markets (and also

[49] The company researches on the pathological mechanisms involved in neurodegenerative diseases and identification of new therapeutic targets. The firm's proprietary bioactive discovery technology (Global Platform Screening for Drug Discovery - GPS D) is based on the use of yeast as a model organism, because the yeast physiological response is analogous to many human aspects, providing a tool for the testing of biological activities with relevant application in commercial products for different cosmetic and pharmaceutical markets (Bioalvo – Corporate information, 2013).
[50] Expresso da Meia Noite, SIC Noticias (1/6/2012) (Newspaper).
[51] The firm owns a natural extract library, holding unique extracts derived mostly from a diverse array of microorganisms that can be industrially produced by laboratorial sustainable culturing methods.

its exclusive microorganism collection). Bioalvo was able to expand its consortia financed projects and entered the US market via a collaborative agreement with the pharmaceutical group AlphaVektor[52].

- 2013: carried out its first clinical trial with a product that had been fully developed in-house.

5.4.2. Knowledge base, learning triggers and responses

Knowledge base

Table 5.7 summarises the main knowledge base of the firm. The biotechnology sector in Portugal is very much university based, with rooted developments in terms of both product and process. Bioalvo's core knowledge resided principally in the R&D experience acquired by research staff at Lisbon University prior to the firm's start-up. The CEO ran an international network, related to her previous role as a senior researcher in a number of international universities and research institutes. By 2013, the initial team of three directors (whose roles were R&D issues, access to funding and to new partners/clients, respectively), who came from the firm's venture capitalist shareholder (InovCapital) had accumulated considerable business knowledge as a result of their experiences in accessing new partnerships, clients and financing at international level. In the meantime, while engaging in prestigious international partnerships (e.g. research institutes) the company's R&D team continuously improved its knowledge in terms of new applications for its core technology platform[53].

Learning triggers and responses

Table 5.7 shows that the company internationalized early on in 2006, to some extent to take advantage of public investment opportunities (e.g. European funds) and internal patented knowledge (on the central nervous system diseases), and to meet emerging client demand at international level, as well. Early internationalization enabled it to overcome domestic constraints, including a lack of domestic partnerships, financing sources and collaborative environment. The Portuguese biotechnology sector was very

[52] This American group acquired the rights to development and use of extracts from marine bacteria collected by Bioalvo.
[53] The company holds a proprietary pipeline of bioactive ingredients in distinct phases of development, with diverse applications across different markets from Therapeutics, to Nutrition, Health & Beauty, and Chemical & Household to industrial processes.

young, made up of only a few small firms, and located in a geographic peripheral region, with little evidence of clustering around universities and other sources of research knowledge (e.g. labs) (see section 3.5.1).

Bioalvo experienced a number of shortcomings in relation to its Portuguese domestic context: a lack of resources and support related to internationalisation and international markets; difficulties experienced in relation to the country's inefficient system of patenting proprietary rights; a lack of supportive administrative services; difficulties in relation to co-ordinating institutionally the different goals of firms and universities within formal partnerships; and the lack of appropriate support facilities such as technological parks. For instance, the firm experienced difficulty in coordinating international contracts because the local consultants had little experience in mastering international procedures. Also, Bioalvo experienced difficulties in adapting the firm's long term return of investment goals to the rapid return demanded by its shareholders. As a result, delays in obtaining long-term financing also delayed the introduction of new products to market, thus also benefitting competitors. As time elapses, the cost of maintaining a patent increases, and if the product is not on the market the company is losing money.

Conversely, as Portugal's accounting rules require patent fees to be classified as costs of the financial year instead of investment, the firm appeared to present a poor track record in terms of its end of financial year statement, thus reducing its chances of obtaining long-term financing. The firm was also compelled to outsource manufacturing capacity due to the scarcity of appropriate manufacturing sites or technological parks located near potential client firms and other important knowledge sources and partners (e.g. universities). There was a "*lack of room to produce on a large scale"* (Bioalvo, CEO).

Alternative financing through domestic public funds was excessively time consuming, which delayed and put at risk the financing: "*there is bureaucracy and inefficient management in implementing public funds.*" (Bioalvo, owner-manager). Although the firm was supported by engaged and committed shareholders, venture capital was experienced as difficult to attract, particularly given venture capitalists' preference for other sectors with quicker returns on investment. Bank financing did not suit biotech needs in the long-term, because of the high interest rates applied and large amounts of investment needed across a time span of 15-20 years. However, the company applied

successfully for European financing for a number of substantial R&D projects involving other partners[54] and attempted to earn first its reputation at the international level to further build up a domestic client base. Significantly, the financing obtained from European projects was less bureaucratic than the domestic ones, although it demanded a larger consortium.

Table 5.7 BIOALVO Knowledge base, learning triggers and responses

Knowledge base	Constraints experienced	Responses
The team of directors hold PhDs and pre start-up informal network; Owner-managers and founders have different professional background from predominantly in life sciences, but also including finance (2005);	Institutional financing in 2005; First patent in 2006; Important orders and new investment in 2009.	Internationalize, recruit and restructure in product development and services (2006); Licensing (2006).
	Available local skilled R&D labour force; Difficulty in communicating internationally; Difficulty in building domestic partnerships;	Resort to a broad international R&D and business network (e.g. Universities) (2006); Apply for international investment programme (2009);
	Lack of business knowledge;	Recruit an American business developer (2010);
	Difficulty in maintaining distance business developer;	Dismissing of business developer (2011);
R&D knowledge on new ingredients; Business knowledge on international markets, networking and funding (2013)	High domestic bureaucracy to access financing; Identification of new opportunities.	Diversify to other less regulated and risky businesses (2011); Internationalized further (2011).
		Applies for important international financing (2012);
	Need of investment to explore potential competitive position; Lack of appropriate room to install productive units.	Built up three additional labs and three strategic units (2012); Attain important North American partnership (2012); Held the first trial of a fully in-house developed product (2013).

To address those major constraints the company responded in a number of ways. Because of the main constraint in accessing long-term venture capital, the company started selling consultancy services, the income from which was used to fund its longer term projects. Bioalvo also raised funds through licensing of drug R&D for cancer and diabetes diseases, by diverse product applications in the North American markets.

[54] E.g. the 'Bluegenics' project involving 14 partners in searching for substances from the deep sea to combat osteoporosis and other human common diseases, which has received funding of EUR 6 million from the European Commission.

However, the diversion of efforts into non-core R&D activities (e.g. service provision) also contributed to delaying the introduction of its core product in international markets and, in 2012, Bioalvo recruited an American business manager to address its lack of international business knowledge: "*We are mostly a technological firm with technologists; it is not easy for us to get suitable management knowledge"* (Bioalvo, CEO). However, the firm was not able to afford those who had been newly and expensively hired, and they ended up being dismissed after a short period of time.

Because of its difficulty both in accessing long-term venture capital and acquiring the business knowledge needed to market its products in international markets, Bioalvo decided to diversify into the new business of marine microorganisms[55], aimed at a large set of client industries, and with a less regulated and shorter four year investment cycle making it easier to obtain financing. In 2012 it internationalized further and created three organisational strategic business units[56] to address emergent strategic areas. The company sought to capture additional international funding and positioned itself as a specialist in different markets to avoid undifferentiated low-cost competition, principally from China and India. In 2013, an important partnership was achieved (the first direct client in the US) and in 2014 the firm carried out the first clinical trial of a completely internally developed product.

5.4.3. Learning processes

Table 5.8 summarises Bioalvo's learning processes, with the key processes highlighted (in bold). Although it learnt organizationally at the exploitative level, and through its actions and related learning 'by doing', the evidence indicates that the company learned principally by networking with clients and partners, seeking new opportunities, and planning its business goals, in exploring new procedures. As well as exploiting their existing knowledge through the provision of related services, the company explored new opportunities in terms of potential new businesses based upon the company's core technology.

[55] E.g. the '*Lusoextract*' was a 36 months project of 0.9 M € financed by the National Strategic Reference Framework (NSRF), involving 7 partners in a large consortium with several universities and research institutes, to create a library of natural products. These were extracted from various microorganisms samples isolated from distinct Portuguese ecosystems, targeting the pharmaceutical research on new compounds.

[56] These consisted of an innovation unit to interact with clients and suggested solutions, a natural products unit and an automated robotic production unit.

The company can be seen to have continuously improved its R&D capabilities including, for example, as a result of actions taken to further adapt and improve its existing products. The learning was especially centred on internal R&D because "*the firm concentrates on procedure improvements within an industry that is very strict with regard to efficiency and safety-related procedures"* (Pharmis).

Furthermore, there is evidence of the firm's learning being advanced through collaboration with external organizations. Bioalvo searches and networks principally through the CEO and a recently built internal innovation unit, with partners, clients and suppliers. Its owner-manager searched partners and clients to find out how to fulfil market demands, for instance by visiting and observing potential partners' and clients' best practices: "*we first listen to the market and find out what we have to do that could fulfil the market demands"* (Bioalvo, CEO).

The evidence shows how opportunities were shaped in a process involving an interplay between individual and collective knowledge, and by linking and extending the company's strength in R&D through alliances with distant clients and their access to funding and knowledge (e.g. PhDs taken abroad). The firm's networking occurred with other European firms to enter into in-licensing collaboration and access external knowledge from clients, labs, universities and contracted service suppliers. The company was part of a production stream that starts at R&D and ends in the pharmacy, thus needing complementary knowledge such as specialists in formulation and product: "*we focus on consortia which need our technology or our collections of sea bacteria to work with ... partnerships are central to the success. If we do not do it, we are unable to build competencies*." (Bioalvo, CEO). Employees who had completed their PhDs abroad brought additional contacts. Meetings and conferences were held with mentors and partners, located in important markets (e.g. US) which added business knowledge and market feedback[57]. Significantly, the option of drawing on specialist consultancy support was avoided because the firm felt that they could not afford it.

Inter-organizational learning was central to communicate, internationalize further, access European investment programmes and gather external complementary knowledge from diverse actors. The company, dependent on shareholders who wished

[57] E.g. the company networked through the UTEN - University Technology Enterprise Network (UTEN), which was a network of professional Technology Transfer Offices (TTOs) focused on the commercialization and internationalization of Portuguese Science and Technology.

to influence how their venture capital was being invested, also thoroughly planned its strategy. The planning process occurred through a 'bottom up' process with the cooperation of all employees, through periodic and formal meetings, in which minor adjustments were made.

Occasionally, the company compared its core capabilities against the market demands, and looked at how it could close that gap with an improvised and innovative product. This occurred through intermittent 'brainstorming' sessions, in which business and R&D knowledge, brought by the CEO and R&D staff, were combined: "to *compare what we were doing internally against what the markets were demanding ... imagining the contribution of Bioalvo"* (Bioalvo, CEO). Planning corporate goals and, more infrequently, improvising potential innovations constituted principal ways of assimilating and embedding external knowledge within the organisation.

Table 5.8 BIOALVO Learning processes

Learning modes	Knowledge	Learning scope
'by doing'	**R&D, Business**	**Owner-manager, Staff**
Networking	**R&D and Business**	**Owner-manager, labs, universities, contracted service suppliers**
Searching	**Business**	**Owner-manager and staff**
Planning	**R&D and business**	**Owner-manager and other actors**
Learning to learn	R&D and business	Owner-manager. staff
'grafting'	Business	Owner-manager, managers
Improvisation	R&D and business	Owner-manager, staff
Training	R&D and Business	Owner-manager, staff

Frequently occurring (bold) and occasional learning processes

Finally, the firm's investment needs drove the diversification of its business and triggered a process of new learning techniques, 'learning to learn better', to change existing practices. For instance, Bioalvo significantly changed its organisation structure and how it allocated new responsibilities, creating newly defined functions that were better able to respond to client demand. "*The need for investment and the strong competitive position to explore our product were the drivers that pushed us."* (Bioalvo, CEO). Bioalvo carried out such a learning mode only on one occasion, in restructuring

towards the marine microorganisms bio compounds. Vocational training was rare[58], whereas 'grafting' external business expertise was attempted only once and revealed to be unsuccessful.

The management team played a central role in promoting all of these learning processes. The CEO, who was also the founder, was pivotal with respect to sensing and selecting new business opportunities that were judged to be within the scope of the firm's core capabilities. The CEO attained an integrated perspective of the firm, gathered the organizational team and external expertise, represented the company at an external level, observed competitors and was open to and constantly seeking partnerships that could help grow the business: "*I have those traits of an entrepreneur: I know what to do and I must allocate resources to do it … I used to supervise those processes alone.*" (Bioalvo, CEO).

5.4.4. Learning outcomes

Table 5.9 shows the capabilities developed by Bioalvo during its history and the competitive advantages gained. The firm's openness to external sources of knowledge and resources enabled the company to get closer to important markets, attain financing, diversify its business portfolio and find partners to help commercialize its technology. Conversely, internal learning led to business specialization and continuous improvement in the firm's products and processes. This helped the company became a specialist in an ingredient platform, flexible enough to meet different client needs, constituting a trusted and scientifically endorsed product.

[58] For instance, staff who had benefitted from attendance of external training were expected to communicate what they had learnt internally by a seminar to others in the firm, attempting to link R&D and business into an integrated management.

Table 5.9 BIOALVO Learning outcomes

New capabilities	Competitive advantage
New processes for new businesses; An Integrated product; More capacity on consultancy services; Acquisition of international business knowledge.	More efficiency through continuous improvement and quality control; Brand awareness through the seal of the scientific community; Diverse portfolio (e.g. health and beauty client industry); Better competitive positioning through integrative product base; More capacity to attract investment; Organisational improvement.

The networking activities of key staff within the company enabled it to find the large partners needed to commercialize its microbial technology under licensing within the health and beauty industry, also building the prestige that helped attract new clients. The reputation gained in the meantime, by networking with large partners, published articles or granted prizes, allowed it to successfully apply for new projects. Bioalvo was also able to strengthen its consultancy and financing capacity through attracting investment, for example in terms of European projects. The company developed integrated procedures within a supply chain that increased the interaction with external partners, augmenting thus its business portfolio[59]: "*We focus on consortiums which need our technology or our collections of sea bacteria to work with ... we apply our technology to other potential clients .... we repositioned our image and used capabilities we already had but weren't applied*" (Bioalvo, CEO).

5.4.5. Summary

This case study of Bioalvo demonstrates the effect of capital and expertise influxes on the choice of strategic paths. The firm's early knowledge was mostly R&D based although the head founder/CEO attempted to improve her business knowledge, principally during the process of managing, through external searching and networking. Although the CEO held business skills at the start-up, they proved to be insufficient to

[59] The company's technology could serve for instance as the innovation unit of Procter and Gamble, or Unilever, providing the technology to research for ingredients upstream, to be combined into a final product, downstream.

succeed internationally, and the firm's management skills were developed in the context of working alongside (and learning from) other, more experienced managers, in partner organisations. Internal learning was also intense, principally in terms of experiential 'doing' and business planning. In addition to the domestic difficulties in obtaining relevant business knowledge, the company has faced problems in building partnerships with manufacturers in particular.

Another serious constraint related to domestic sources of finance, with sources of public support being experienced as excessively bureaucratic, pushing the company to rely more on shareholders. The company needed long-term venture capital, which was scarce at the domestic level. When the firm took advantage of European funding it rapidly internationalized and was even able to afford external expertise temporarily. Once this funding ran out, the firm had to restructure, invest in the less regulated business of identification of marine microorganisms, and apply for additional sources of investment. Although the company relied heavily on its patented knowledge that needed to be improved in order to access important investment sources, it gathered external substantial complementary knowledge in terms of clients' technology, being relatively 'open' in terms of innovation practices.

The CEO played a central role in promoting the firm's learning processes. She presented a global vision from the outset and accordingly set strategic objectives that were engaged with and further discussed collectively and informally. Managing the different dimensions of the firm's entrepreneurial capability required certain leadership skills that simultaneously allowed opportunity for exploration while also fostering exploitation. In particular, while continuously improving its core research capabilities, Biovalvo explored and secured new business clients. This flexibility and responsiveness in developing new applications for its core technology can be seen to constitute its key entrepreneurial capability.

5.5. ALTITUDE

5.5.1. Introduction

Altitude Software started up in 1993 under the brand Easy Phone and changed its name in 1999. It operates in Customer Relationship Management activity (CRM), with around 1100 customers in 80 countries and was ISO 9001 certified for its worldwide support to clients. It was the first software enterprise in Portugal that built a software interface between telephone and PC. Its product "*Altitude uCI*"[60] is a software suite that manages in real time enterprise functions such as Customer Service, or Help Desk, thus accelerating the creation of services and campaigns via its integrating technology.

The company provided its products through a suite of selective modules that constituted an integrated and tailored approach via close client collaboration[61]. The open architecture of Altitude solutions integrates with existing contact centre solutions, preserving investments in traditional systems. In 2012, the company employed up to 400 people worldwide and, overall, had experienced two digit growth in most years, although this fell in 2011 from 13% to 7% due to the adverse economic context.

The company has experienced a number of critical events throughout its history. Specifically, in 2002, it faced financial difficulties that compelled it; first, to recruit an international business manager; and second, to reduce personnel (mostly in non-R&D areas); and third, to change its shareholding structure. Since then its growth has been based on its integrative CRM software platform, and in 2012, 80% of its business was in overseas markets, the growth in licensing was of 23%, and it had diversified into a range of cloud computing related products. The firm's products have shared a common R&D knowledge base, and a CRM software platform, which was able to integrate partners' and clients' technologies. It is an accredited provider of software solutions (e.g. ISO2001).

[60] Unified Customer Interaction
[61] E.g. the vendor is allowed to adapt the platform to the partner / client needs.

5.5.2. Knowledge base, learning triggers and responses

Knowledge base

Table 5.10 shows that the company was started almost entirely by highly qualified founders, all with PhDs and previous experience in R&D. It had a technological and international orientation as a software supplier to the banking industry and its board was initially made up of technical engineers, holding R&D knowledge on technical support (5 top managers). Product development was highly centred in Portugal where product developers were crucial, while business development was complemented with marketing inputs from local managers[62]. A new owner-manager with international business experience was recruited in 2003[63]. He brought new knowledge regarding processes, certifications, and products that ended up changing the firm's strategic orientation.

Learning triggers and responses

The ICT sector presents strong tendencies towards integration. The convergence of computing and communication technologies as a result of digital common technology has meant that ICT products tend to become part of broader integrated systems. Thus individual products - like personal and mainframe computers, robots and communication systems – are also components of a broader technological system. Altitude's start-up responded to the growing demand for software products from the banking industry (Table 5.10). In responding to this opportunity, Altitude began its internationalization process first by targeting Brazil, a culturally close country. Then, a new product opportunity was identified with regard to a CRM-related technology based on the firm's internal capabilities that incorporated PC and communication systems. Altitude developed a new hybrid PC/phone product for global markets and internationalized further to escape domestic constraints: in particular, the firm's peripheral location, a lack of a sufficiently supportive/collaborative environment and Portugal's ongoing economic difficulties.

[62] Portuguese technical universities fed the firm's staff with good engineers and at low cost compared with other countries such as Germany or USA. The company has been able to retain most of its technical staff, with a decrease of just 15%.

[63] E.g. he had an engineering degree and an MBA and spent seven years in the USA doing digital software to military and three years on Germany in Siemens as a software developer.

Table 5.10 ALTITUDE Knowledge base, learning triggers, and responses

Knowledge base	Constraints experienced	Responses
Owner-managers / founders, PhDs with competences in R&D (1993);	Need of software by financial institutions	Software built and sold in Portugal and Brazil (1993)
	Demand of software that combines computer data and phone.	Development of a product that allows using the phone to communicate bank data or sell new products (1994).
	Lack of domestic networking, cooperation with university, public support and competitive intensity; Bureaucracy in applying for European funds.	Further internationalization (1995)
Competences on business networking and partnerships (2013);	Crash of the 'dot.com' titles; Difficulty in getting new distant partnerships; Strategic turbulence in geographic segments; Shareholders structure.	Changed investment sources (2003); Recruited an owner-manager with previous international high tech business experience (2003); Restructured sales and professional support areas (2004);
	Technological evolution;	Developed PC communication technology (2005);
	Very similar competitors' platforms;	Produced 'open source' suitable platforms, compatible with clients' technology (2009);
	Demand for 'cloud' technology	Diversified to 'cloud' technology (2011); Acquisition of the Swedish firm to better commercialize solutions (2012);

At the domestic level, the company was unsuccessful in applying for European funds, which required time consuming applications and targeted only certain industries and regions[64]. For example, support related to hygiene and safety at work was available only to high tech firms with headquarters located in southern Portugal, which excluded Altitude. Thus the company benefited little from public aid. There was also a lack domestic partnering opportunities due to the small domestic market with few large international brands and universities (see section 3.5.2). Universities were experienced as averse to partnership and unable to work within the firm's short project research span. The Portuguese software sector was undeveloped, compared for instance with the Netherlands. There were few product development units and the interaction with the

[64]E.g. applying for funding was experienced as a very time consuming process in preparing the application, ending up losing the time to market. Although the formal support existed, it went through too many authorisations to access the funds. Also, Altitude as a group is either considered an SME or a large enterprise, depending on considering the employees allocated abroad. Such ambiguity did not accomplish the eligibility to public funding.

university was sparse in terms of common projects, whilst it was also very expensive to find a project coordinator: "*Up to the end of the 1990s we felt like we were in a desert because we were the only Portuguese firm in this industry*" (Altitude, CEO).

The firm's peripheral location hindered its ability to engage with key international actors and significant events (e.g. such as product fairs in northern Europe), within a sector highly dependent on reputation ('buzz') worldwide. Brand awareness was crucial, particularly in terms of the US, because nine of the ten key players were North American. In the meantime, the company experienced the impact of the world economic crisis which increased international competition and made it more difficult to develop effective international partnerships[65]. Domestic shareholders did not meet the firm's expectations, making it difficult to obtain financing[66].

In an effort to address these issues, the company acquired a new CEO with a vast international business background, reduced its non-core R&D staff and changed the shareholding structure in a way that enabled better access to more European capital. It experienced an average sales growth rate of 12.7%, from 2006 to 2009: "*We have one critical success key, the staff we have in product development … who have been with us for 10, 15, 20 years*" (Altitude, CEO).

The firm's technology continued to evolve towards a more customised PC/ communication product, although the products remained similar to competitors' and easy to imitate, bringing the need to develop an open-source platform, at once suitable for diverse partners and capable of generating client loyalty[67]. In 2011, based on its traditional CRM technology, the company developed a new product based on cloud computing, acquired a foreign company to help commercialize it and engaged in prestigious partnerships (e.g. including Microsoft) to help build its reputation and access to clients' technology.

[65] The competitors started offering equipment with functionalities and price very similar to Altitude's, as Portuguese firms were ignored against large international players and substitute products on the 'cloud' were increasing.
[66] In 2011 the firm did not achieve a two digits growth and several projects were halted or postponed.
[67]Loyalty was particularly valuable as it has been earned by continuous R&D improvement and prestigious ISO certifications.

5.5.3. Learning processes

Table 5.11 summarizes the company's learning processes in terms of the dominant modes and scope of these. The evidence suggests that it learns 'by doing' procedures experientially. It also learns by networking with external stakeholders, planning at international level, searching new products and 'grafting' external expertise. Frequently, the company had to learn how to embrace new procedures related to changing technology which led to subsequent reorganization. Altitude was able to orchestrate and synchronize the correspondence between its internal and external resources through the simultaneous exploration and exploitation of opportunities, thus matching the firm's actions with its rapidly evolving environment.

The company learned by taking action when adapting incrementally to changes[68]: "*this business phase is more incremental than inventive and we must adapt continuously to regulation and technology changes*" (Altitude, owner-manager). It has learned by networking with clients, partners and consultants through meetings and workshops, attaining proximity to markets and adapting the firm's technology. For instance, Altitude supported continuously its local managers, through for example online marketing management - four top managers (product, customer assistance, professional services and marketing) plus eight regional managers reported to the CEO. It also attained prestigious partnerships and was the first Portuguese 'gold' partner to Microsoft and its only software vendor: "*the technology is ours and the service is theirs … It is about the proximity to the final client ... our clients are the main sources and channels of knowledge ...''* (Altitude, CEO).

Learning also took place through planning strategically and collectively in an attempt to anticipate future needs[69]. The planning of business goals occurred by a 'bottom up' decision process, in which all local managers were gathered once a year to analyse the industry and set the main goals. There were also periodic meetings held every three months to reflect on progress and adjust the business plan and strategy and also monthly meetings to analyse occasional operational issues. Altitude followed around 70-80% of their set plans, in which results were continuously compared against initial goals: "*we*

[68] E.g. in addressing domestic restrictions, applying for European funds and accomplishing an expected number of opportunities – in 2012 the set goal was to fulfil 50% of opportunities within 100 leads.

[69] E.g. the company, following a change in marketing demands towards applications in the 'cloud', predicted it and designed an appropriate organisation and product to be offered in advance of competitors

have been realizing for a long time the need to diversify to the 'cloud' but we have never thought of how we would transfer our technology" (Altitude, CEO).

The company searches as well for particular features that could fit its product. The searching was made through periodic meetings with clients from different locations, online journals and blogs, and listening to the client when selling products and in providing post-sales assistance. 'Grafting' expertise and external enterprises was a less recurrent learning mode instead preferring to achieve proximity to clients in order to better fulfil their needs. For example, Altitude recruited local commercial staff and acquired a former client, a Swedish company that already used 'on the cloud' technology.

Engaging in new ways of better learning involved 'top-down' strategic decisions and innovation at the highest level, for instance through moving toward new internet-related technology: "*Our capabilities in taking advantage of new knowledge constitute a facilitator. For instance, the ease in which we move forward into a new platform technology.*" (Altitude, CEO)[70].

Table 5.11 ALTITUDE Learning processes

Learning modes	Knowledge	Learning scope
'by doing'	**R&D, business**	**Owner-manager and R&D team**
Networking	**R&D, business**	**Owner-manager, clients and partners**
Searching	**R&D, business**	**Owner-manager and management**
Planning	**R&D, business**	**Owner-managers and regional managers**
'Grafting'	R&D, Business	Owner-manager and other actors
Learning to learn	R&D, business	Owner-manager, R&D team

Frequently occurring (bold) and occasional learning processes

Evidence indicated that the firm's R&D and business knowledge combined in most learning modes and widely, including through international partnerships. However, it also showed that the top management team were central to this both in sensing and

[70] The consultancy Gartner classified Altitude as Leader, Visionary and Challenger during the past 10 years (Altitude, Corporate information).

selecting new opportunities and in identifying potential constraints. The top management team ensured the best technology in the product and set priorities according to external knowledge inputs. The team of directors participated in all these R&D/ business learning levels, through informal means, supervising the R&D teams and by periodic meetings. In addition, evidence suggests that Altitude hardly ever developed new products or processes by experimental trial and error procedures or improvising solutions. Formal training events focused only on post-selling client support in different branch locations.

5.5.4. Learning outcomes

Table 5.12 shows the company's learning outcomes. The firm continuously improved its R&D capabilities both by addressing issues efficiently, and by absorbing relevant external knowledge through external learning with clients and partners: "*half of the revenue comes up as software licensing and the other half results from close professional services*" (Altitude, owner-manager). The continuous improvement, principally as a result of knowledge management systems[71], provided rapidity and certification (e.g. ISO 2001), while 'grafting' external knowledge (via the acquisition of three companies to date) constituted a competitive advantage in terms of quick acquisition of new capabilities.

Table 5.12 ALTITUDE Learning outcomes

New capabilities	Competitive advantage
R&D capabilities in building a customized integrative software platform; Continuous improvement; Networking, 'grafting' capabilities.	Integrative product, with 20 interrelated sub-products to diverse client units; New 'cloud' technology; Rapidity; Certification; Acquisition capacity; Professional services; Prestigious partnerships;

[71] E.g. by facilitating intra group communication through a 'wiki' model around hot topics, instead of a rigid and time consuming work flow.

Increasing business diversification throughout technologically-related products, led to R&D capabilities in building tailored products, which led to competitive advantages in building 'cloud' computing based products that involved distributing computing compatible with competitors' platforms over a network[72]. This continuous improvement led to a successful certified product principally at service level, which attracted prestigious partners (e.g. Microsoft): "*Despite the important role of clients and partners, our R&D department is continuously innovating with new tools, programmes, etc*." (Altitude, CEO).

5.5.5. Summary

A distinguishing feature of this particular case was the effect of the recruitment of expertise on the firm's learning pattern. The company's behaviour was triggered by contextual events such as the limited domestic level and importance of global markets in the sector that forced it to internationalize. Further, the company engaged in prestigious partnerships and 'grafted' external business knowledge, by recruiting an international manager and acquiring other firms.

As a result, the newly recruited CEO brought additional international business and product development knowledge and, along with the senior management team, learnt conjointly by searching external opportunities. He also played a central role by combining internally the acquired knowledge and through planning business goals. All of this process was enhanced by the development of the firm's knowledge management systems.

Another crucial feature in this case relates to the domestic core R&D team, which was able to build products through integrative approaches. Such internal R&D capability and the successful external partnerships constituted the firm's competitive advantage. The early application of an ambitious business learning model introduced by the CEO, and the commitment to continuous improvement, assisted the firm in building international business knowledge and in combining different businesses and channels,

[72] The company has 5 key technical areas and 20 interrelated products within it that are suitable to competitor components. The company's software platforms could be customised to distinct client businesses, through new distribution and complementary channels. In this way, the firm could provide online solutions to fulfil the marketing demand in real time.

such as professional services and licensing. In this way, the company's products were co-developed openly with a number of international partners and clients.

The company's entrepreneurial capability was based on its ability to build integrative systems. The company shaped opportunities by creating 'open source' platforms that could be adapted to diverse client product needs, including cloud computing applications. It also enhanced the integration of collective knowledge through an internal 'workflow system' and also by outsourcing local professional services. These procedures enabled the opportunistic restructuring of the company when required, with the top management team being central to sensing and selecting relevant opportunities.

5.6. NFIVE

5.6.1. Introduction

NFive develops software and electronics applications for security, automation and identification markets. It started in the identification market, through card design and printing software and became a specialized printer driver developer, also developing label printing, visitor management software, and related security systems. The company started up in 1996 as an international venture in partnership with a French partner. Key critical events include[73]:

- It participated in its first international exhibition (1997);
- Developed its own smart cards technology (1998);
- Opened an office in the USA, following a new automation program (1999);
- Started its electronics research (2000);
- Developed a new security card product (2001);
- Established offices in Italy, Singapore and became ISO 2001 certified (2004);
- Redefined its product lines, releasing its integrated access control package solution (2007);

[73] NFive – Corporate information (2013).

- Developed the Pen Five, a miniaturized device similar to a flashpoint (2008);
- Centralized operations in Portugal and started working with '*master distributors*' to reduce costs and better cope with the global economic crisis while releasing its first electronic product[74] (2009);
- Started developing and producing its own electronics products, offering an integrative solution and allowed the licensing of its Pen package online, in the internet, on the 'cloud' (2012);
- By 2013, the company had 40 employees, 400 distributors in 106 countries and exported 98% of its business. Over the last decade it has reduced its size, and sales have decreased in the last couple of years.

5.6.2. Knowledge base, learning triggers and responses

Knowledge base

Table 5.13 summarizes the company's knowledge base, its main learning events, and subsequent responses. In its early start-up phase, the company's R&D knowledge was held by its owner-manager/founder, who developed the identification software business during the 90s. His skills were to some extent self-taught, building on an unfinished university engineering degree and his professional training as an employee for large high-tech firms including IBM. Furthermore, since its inception the company also held a core R&D team, mostly unchanged over the years, and made up of qualified people, who had been recruited from local universities. More recently, the changes have been mainly in international sales and marketing, while R&D staff and the firm's main technology remained almost unchanged.

Learning triggers and responses

Table 5.13 shows the firm's principal learning events along its history and subsequent responses. The company internationalized early on, driven by its experience of domestic constraints, consolidating its business worldwide and diversifying by developing related products.

[74] TS ACTA - an integrative product that included identification, security software, and electronics.

Table 5.13 NFIVE Knowledge base, learning triggers and responses

Knowledge base	Constraints experienced	Responses
R&D knowledge; International networking since inception; Qualified and flexible R&D team (1997);	Business development of identification security cards; Lack of public support; Bureaucracy; Financial regulation; Lack of domestic knowledge transfer;	Engaged in international partnerships(1996); Internationalized (1996); Searched clients' needs (1997); Opened international offices, first in US and then worldwide (1999);
	Global economic crisis;	Shut down branches abroad (2008); Downsized businesses (2008); Restructured and externalized business functions (2009); Kept the core R&D team (2009);
R&D capacity; Integrative approach; international business knowledge (2013)	International competitive intensity and running out of traditional business niches;	Diversified to a technology related 'cloud product' (2012); Diversified to a new integrative electronic platform (2012); Licensing distributors (2012); Franchised the business to others (2012);

The company experienced the following constraints in relation to its domestic context (NFive, owner-manager):

- Ineffective public support for firm internationalization, as when AICEP for instance presented Portuguese software in international fairs, in the Portuguese language;
- Bureaucracy in accessing European funds and bank loans, in which the process was very time consuming and the regulations were constantly changing and bank loans were very demanding in terms of warrants;
- Excessive regulation in terms of taxation that did not exempt R&D investment[75];
- A limited relevant knowledge transfer between universities and firms meant that they did not share common interests with regard to R&D projects (e.g. divergent time span of ROI).

[75] In Portugal, firms must pay a special tax in anticipating potential profits that is estimated upon the profits of last year. In this way, profits that could never occur in the future are taxed in advance.

The firm addressed the above mentioned barriers by internationalizing, adopting a close customized position with clients, and by networking through international partnerships[76]: "W*e share knowledge … listening to the client has been our winning strategy since the beginning … The simpler solution to the client the better – this is our main driving force"* (NFive, owner-manager); "*the owner-manager interacted informally with universities, in order to avoid bureaucracy*" (Strike[77]).

NFive also reduced costs (e.g. by externalizing functions). In 2008, the world economic crisis forced the company to reduce its size, and foreign branches, externalizing most of its commercial functions, but retaining its local R&D team and it also started working with large distributors that allowed greater access to clients: "*There were substantial changes ... except in R&D … the added value is based on the operations and R&D, the main firm's knowledge*" (NFive, owner-manager); "*There was a concern to keep the company small and manageable, with competences based on identification software ... as the firm has always been self-funded*" (Strike, owner-manager).

Furthermore, the world economic crisis caused the company's traditional businesses of security cards to decrease, compelling business diversification to internet-related technology, in the 'cloud' and to an original electronic integrative platform of identification control. The firm's core technology remained the same, although with related product and process improvements[78]. Combining the firm's traditional software with a customised electronic device was a significant change towards an integrative solution that allowed the provision of further related products and ensured clients' loyalty through licensing[79]: "*The major drift in our business consisted of changing from the software to electronics*" (NFive, owner-manager). In 2012, the company franchised its business to an American partner, in order to increase its level of self-funding and, in the meantime, it changed its business strategy.

The responses to those constraints were much centred on the owner-manager. Since its beginning, the company has been organised around its single owner-manager, who has searched and networked internationally: "I was a *self-made man owning my own*

[76] In order to build trust, for instance, clients were invited to visit the firm and stay a couple of days.
[77] A firm's partner, Paulo Morais, Owner Manager, interviewed in February, 15st 2012.
[78] E.g. it replaced the physical licensing USB device by an online subscription, in terms of license control and the operational processes of payments were simplified as clients get into the net, 'buy and pay'.
[79] The assistance to clients is ensured and the product could be upgraded electronically, which constitutes a service providing and increases loyalty and accuracy in fulfilling client demands.

enterprises that I built through blood, sweat, and tears, without any corporate characteristics but only by a one-man show" (NFive, owner-manager).

5.6.3. Learning processes

Table 5.14 summarises the main processes by which the firm has furthered its learning and development. Processes of learning by doing have particularly underpinned ongoing improvements to the firm any conducts, while networking with local distributors and searching and improvising new R&D solutions have played a key role in exploiting new opportunities. The firm adjusted operational changes to the turbulent institutional context 'learning by doing' for instance, via minor adjustments to current products. At the R&D level, learning was apparent through continuously improving technology to suit new client needs: "o*ur experience is paramount to manage innovation ... sometimes we learn that a complementary product sells better than the original product itself ... it is very difficult to avoid addiction to some routines that were previously created in the meanwhile; it is a learning continuum ... it is difficult to unlearn and start producing new products"* (NFive, owner-manager).

Networking, particularly with suppliers and clients and in order to build collaboration, was crucial[80] as "*we are connected to several producers of components, which provide us with important information … we have relevant information from distributors as well …* w*e are almost a central unit of information processing … The knowledge is external but ends up being managed internally"* (NFive, owner-manager). The constant searching for new client needs was carried out by the owner-manager, who was proactive in terms of anticipating new trends and the sensing and selection of new opportunities: "*A new technology seems to be coming up now – UHF Gen2 – driven by the market ... We have searched market segments that were able to adapt to such 'fusion' technology"* (NFive, owner-manager).

[80] E.g. attending international meetings, listening to the clients, testing ideas and engaging on alliances.

Table 5.14 NFIVE Learning processes

Learning modes	Knowledge	Learning scope
'by doing'	**R&D, business**	**Owner-manager, R&D team**
Networking	**R&D, business**	**Owner-manager and Partners**
Searching	**R&D, business**	**Owner-manager**
Planning	**R&D, business**	**Owner-manager and R&D team**
Improvisation	R&D, business	Owner-manager and R&D team
Learning to learn	R&D, business	Owner-manager and R&D team

Frequently occurring (bold) and occasional learning processes

The company has occasionally changed its procedures, learning differently in order to innovate, when, for instance, it developed a new integrative technology or the new cloud computing software[81]: "*the firm reinitialized and is now re-launching itself ... our last product is revolutionary, introducing the concept of gadget into industrial markets"* (NFive, owner-manager). Both business and R&D knowledge were combined in these learning modes, through the occasional improvising of new product solutions[82]: "*by intense meetings and 'brainstorming' sessions within the firm wherein ideas were easily discussed and implemented"*[83]. The decision process occurred organizationally, although, in the end, the owner-manager had the last word in validating the new procedures.

The company, being small and self-financed, planned collectively and informally, by collecting contributions from staff, although the owner-manager played a central role in synchronizing internal and external conditions and resources for the exploration (identification and creation) and exploitation of opportunities: "*we plan marketing and operations at the same time ... it is intuitive ... I do the planning, I do the strategy and I am a technician … I do the business development ... I felt immense difficulty as a manager, in implementing change to more than, I would say, ten or eleven people*"

[81] For instance, it shut down the international offices and reduced staff from 65 people in 2008 to 12 people in 2011, including a salesman, a systems architect, a technician and a project developer.
[82] E.g. through internal presentations of interesting ideas collected in trade fairs, discussed by partners and staff from marketing and R&D, to clarify both the software's functionalities and market segments to target. Distributors are often invited to express opinions on the products.
[83] A firm's partner, Paulo Morais, Owner Manager, interviewed in February, 15st 2012.

(NFive, owner-manager). The development of new products by experimental trial and error or imitating competitors was not evident. The acquisition ('grafting') of external expertise or even resorting to external consultancy were not apparent, as well.

5.6.4. Learning outcomes

Table 5.15 summarizes the company's principal learning outcomes. The firm attained new capabilities in networking and by developing new products based on the firm's existing technical knowledge[84]. The firm's networking and searching activities helped it to target at once different markets, products and technology (e.g. electronics and internet-related '*in the cloud'* products). Also, it combined previous capabilities into a tailored product, suitable for diverse clients: *"we produce a neutral platform, which works either with Linux, or Windows, or Macintosh"* (NFive, owner-manager).

Table 5.15 NFIVE Learning outcomes

New capabilities	Competitive advantage
New networking capabilities in franchising and licensing;	Integrative tailored approach;
New capabilities in electronic devices and 'cloud' technology;	Product / service 'on the cloud';
Combinative capabilities on integrative platforms	A diverse portfolio of related businesses – e.g. electronic identification, accessing;
	Small size, flexibility, and self-financed.

These capabilities provided some competitive advantages. The firm's integrative entrepreneurial capability allowed the combination of know-how that led to new software and electronics products that responded to the need for flexibility in meeting different business demands. The firm's success has resulted from a combination of factors: its small size, financial autonomy, prestigious partnerships, and the continuous improvement based on a stable core R&D team: "*there are processes changing each three months, being simplified and improved ... the firm's capacity to simplify and integrate processes constitutes a unique capability"* (NFive, owner-manager).

[84] E.g. technology that synthesizes distinct firm's technologies regarding identity, security and automation into a single product in allowing for example go to the supermarket and be charged with no need of debit / credit card - a terminal point to automatically control access.

5.6.5. Summary

The development of NFive illustrates the influence of critical incidents such as the world economic turmoil and competitive intensity that forced the firm to restructure all its functions other than R&D, and then to '*restart*' with what was virtually a new business. The company developed its entrepreneurial capability around the exploration and exploitation of opportunities that it was able to synchronize and shape as internal and external emergent conditions impacted the firm. This allowed NFive to introduce a distinctive new product, suitable for clients' technology and a new cloud computing business, always relying on its core R&D team and technology.

The contextual constraints that the company faced compelled it to increasingly internationalize in its pursuit of collaboration and new funding sources. The company dealt with its critical issues by keeping the balance between its small size, high change rate and learning intensity. The role of the owner-manager in the identification, evaluation, and realization of such opportunities was paramount. In acting as the firm's primary knowledge gatekeeper he was able to link his knowledge of targeted markets with the capabilities of the R&D team over time. He also played a wider role in terms of promoting organisational learning, particularly through numerous informal interactions with staff and joint decision-making with the management team. In sum, the entrepreneurial capability of being able to 'learn how to learn differently' has enabled NFive to restructure and diversify into successful new products and services.

5.7. PELCOR

5.7.1. Introduction

Pelcor started up in 2003 in São Brás de Alportel, Algarve, Portugal, as a spin-out from Novacortiça, a firm that specializes in cork stoppers for the wine industry. The granddaughter of Novacortiça's founder and current Pelcor owner-manager came up with the innovative idea of diversifying the applications of cork and making it more fashionable by creating accessories out of cork skin. The first manufactured accessory, a cork umbrella, was well received at an international fair where the new brand was launched. The company

subsequently developed a range of products based on innovative designs, from home and office furnishings to fashion accessories[85].

Following the early growth in demand for its products, the firm invested in new processes, hired qualified designers and established a design department headed by a well-known designer from the fashion industry. Other new products have followed, for example with newly added colours[86], and the company has gradually internationalized its activity. At the time of writing, Pelcor had a presence in a number of niche markets worldwide and was aiming to establish its own stores while engaging with a number of local partnerships and franchising strategies.

The company experienced the following important critical events:

- The owner-manager was awarded the 'Best European Entrepreneur' and the company remerged with NovaCortiça (2011);
- It developed an online store, presented its collection "*Cork Your Style*" at the New York museum MoMa (Museum of Modern Art) and recruited one additional employee and one Arts Director to reinforce its design team (2012);
- It established new stores in the US and Dubai (2013), also investing in ongoing marketing efforts in these locations (e.g. in fairs and magazines).

During its internationalization process, the company has received public aid from the Ministry of Foreign Affairs (MNE) and the Institute for Portuguese Foreign Trade (AICEP) in promoting Portuguese cork overseas (e.g. through fairs and support in exports). Also it has been partly funded through bank loans and European funds that targeted the cork industry. It exported 80% of its products and has continued to target the fashion and luxury market, mostly in Sweden, France, and the US[87].

[85] e.g. tablets, wallets, belts and parasols (Corporate information, 2013).
[86] Men's Health 04/01/2013; Time Out 2013/04/01.
[87] Expresso Newspaper 15/06/2013.

5.7.2. Knowledge base, learning triggers and responses

Knowledge base

Table 5.16 summarizes the firm's knowledge base, the events which have triggered learning, and subsequent responses. The company's knowledge base was principally built around its owner-manager's previous experience that was rooted in the domestic cork industry as a bottle stoppers producer. She graduated in management, headed the cork family business, and started up her own company as an offshoot of this: "*She was initially self-funded, headed the design management, established partnerships with local leatherwork producers and started supplying new design projects along with 'cork skin' aimed at new products"* (Portuguese Cork Association - APCOR[88]).

The company start-up relied heavily on the business knowledge acquired from the experience of the original family business. The growth of the new business has involved further knowledge acquisition, particularly in relation to marketing and the development of production capacity: *"In the first years we focused on the marketing area trying to work out the brand waiting for distributors to approach us ... since then we felt the need to search for more markets by ourselves ... now we get more international contacts and high production demand"* (Pelcor, owner-manager).

Learning triggers and responses

The company first started selling domestically (in 2003) and internationalized incrementally through marketing campaigns that started in product-related fairs and culminated in important international exhibitions[89]. The company benefited from public support for the cork sector early on and throughout its internationalization process, by successfully applying for QREN funds or receiving support from AICEP[90]. It was compelled to internationalize due to domestic constraints, principally in terms of intellectual property (IP) regulation, difficult partnerships, small market size and economic crisis (see Table 5.16).

[88] Associação Portuguesa da Cortiça (Portuguese Cork Association), Joaquim Lima, President, Interview in May, 8st 2013.
[89] e.g. the Museum of Modern Art (2011).
[90] E.g. ICEP (Portuguese Institute for External Trade) invited the company to important fairs and expositions such as in the MoMA museum in New York, as the Portuguese government was promoting internationally the Portuguese cork.

The Portuguese regime of intellectual property regulation was experienced as one subject to constant change while failing to protect the copyrights held on their products, meaning that domestic competitors were free to imitate without any legal consequence[91]. Imitating firms included some former partners: "*some former partners learn about our products and start making and selling them on their own"* (Pelcor, owner-manager). Also, the small size of the domestic market, the lack of purchasing power worsened by the economic crisis, and the increasing international demand for high standard cork products, contributing to Pelcor's move towards internationalization. It is worth mentioning that the Portuguese cork sector has increasingly invested in other projects besides stoppers, in order to diversify to international, higher added-value markets like, for instance, projects with applications for aircraft, ground transportation and construction.

Table 5.16 PELCOR Knowledge base, learning triggers and responses

Knowledge base	Constraints experienced	Responses
Owner-manager graduated in management and with business knowledge on the Portuguese traditional cork products (2003);	Lack of dimension of the domestic market; Ineffective partnerships with local distributors; Imitation from domestic competitors;	Internationalized incrementally searching for clients through the internet and presence at fairs (2003); Increased flexibility and became a specialist in the accessories market niche (2003);
	Public support in internationalizing cork products;	Marketing campaigns (e.g. MOMA) (2003-2013);
Production and design capacity; Business knowledge on networking (2013)	Increasingly differentiated demand and competitive intensity; Global economic crisis;	Change in product line towards high fashion (2009) Improved R&D and increased production capabilities by merging (2011); Expand to other markets and geographic segments (2012); Diversify to bottle stoppers and products from grain cork (2012); Establish a store in the US and in Dubai (2013)

The company's path to internationalization was gradual, including initial virtual contacts followed by more direct, person to person networking with overseas distributors. Pelcor gradually widened the scope of its internationalization strategy,

[91] E.g. since the clasp of the apparel is different from the original it is not considered imitation and the competitor could sell it.

becoming specialized in high luxury quality markets and developing a more strategic and flexible approach: "*Clients demand different products and we do it case-by-case.*" (Pelcor, owner-manager). In addition, the global economic crisis and increasing competition forced the company first, to continue expanding its target markets, including by slight adjustments to better match products to particular market segments; and second, to diversify to other client industries (e.g. footwear) as its traditional markets became saturated[92]. Although there were difficulties experienced in relation to the domestic context, an important advantage was the ability to build on the reputation of cork and the company's various products as being authentically Portuguese in origin.

The firm's product design and production capabilities were first centralized in-house, to better manage functions in an integrated way. However, there was a perceived need to improve these capabilities by acquiring external R&D and production capabilities, to build capacity, enter into different international businesses and meet increasing demand (e.g. wine corks)[93]. These goals were achieved by remerging with Novacortiça, the previous cork family business.

5.7.3. Learning processes

Table 5.17 summarises the company's main learning modes, showing that it learnt principally by taking action ('doing'), and trial and error procedures. It also learnt by seeking new clients, networking with partners and suppliers and occasionally improvising new products. Learning appears to have been highly centred upon its owner-manager and her ability to sense and select new opportunities, mainly in terms of product adjustments (i.e. slight design changes to address market needs) and gaining new client businesses. This ability of the owner-manager mainly derived from her accumulated, experiential business knowledge. Less evident in this case were learning by formal planning, 'grafting' external expertise, imitating competitors' practices and learning new ways of learning through restructuring.

[92] The business became more specialized and the firm diversified its businesses from fashion accessories to wine stoppers and other luxury industry targets.
[93] In addition to products from 'cork skin' it developed products from granulated, or grain cork that implied a different technology. It held around 100 different products.

Table 5.17 PELCOR Learning processes

Learning modes	Knowledge	Learning scope
'by doing'	**R&D, business**	**Owner-manager, team**
trial and error	**R&D, business**	**Owner-manager, team**
Searching	**Business**	**Owner-manager**
Networking	**Business**	**Owner-manager, partners, clients**
Improvisation	R&D, Business	Owner-manager, team

Frequently occurring (bold) and occasional learning processes

The company improved products 'by doing', and attempted new ones by experimental trial and error, both at business and R&D levels. For instance, a partner requested a tent made of cork, Pelcor piloted this concept, but rapidly abandoned the project in light of the experience: "*we learn a lot by trial and error and know by experience … Let us suppose the client or partner requires a new product for us ... we have never made it so let us make it up and try it! If it is not right at first, we restart and do it again until we find the success formula ... our experience is critical to warn the client that it could not work."*(Pelcor, owner-manager). Hence, the company has learnt by being proactive in addressing upcoming events: "*when we started we didn't have any idea of what would be the business and it has been a continuous learning ... it takes us only one month instead of two months as it used to before, as we had learnt the accumulated experience in the meanwhile."* (Pelcor, owner-manager). The linking and adaptation of the firm's internal capabilities in response to external opportunities principally involved reconfiguring products in terms of design, and by achieving support and gaining new clients through the internationalization process.

This manufacturing firm has learnt inter-organisationally through networking with partners at the business knowledge level, in which the owner-manager was central in identifying business trends and related opportunities by travelling and visiting clients in order to gain better understanding of their needs. This resulted, for instance, in a collaboration with a shoe producer in response to a client's request for a composite product made of leather and cork, and also hiring of external international consultants: "*We learnt the needed industry knowledge through our networking, partnerships, clients, consulting, fairs, and some specialists ... we have all the difficulties inherent in the export and implementation of a brand in a foreign market, with its culture and*

rules"[94] (Pelcor, owner-manager). Hence the owner-manager was central in shaping opportunities and supporting the processes by which the firm has created new products and markets.

The company rarely engaged in production partnerships that could increase its international growth. Initially, Pelcor supplied the 'cork skin' to producers that fabricated the products (such as umbrellas, wallets and so on) and further it centralised the design and production except when it comes to composite products that needed to incorporate other materials.

There is also evidence to suggest that learning by improvising new product solutions occurred through occasional 'brainstorming' sessions, allowing for the exchange of business and design knowledge: "*we then rethink and adapt the options as the opportunities come up ... during the last year we have innovated through new products, new uses of cork materials.*" (Pelcor, owner-manager); "*It improvises a lot as the market demanded cork substitutes and the firm had to find out new products opportunely"* (APCOR - Portuguese Cork Association). Informal meetings to deal with daily operational issues have been the favoured means to share knowledge across the organisation. In this respect the owner-manager also played a key role by directing the firm's functions (e.g. design) and co-ordinating the organization-level capabilities that constituted the firm's overall entrepreneurial capability. This has resulted in continuous novelty generation within the company's operations, including, for instance, diversification into new businesses beyond the firm's existing strategic repertoire (e.g. grain cork).

Formal planning and learning from this was less evident, as it is centred on the owner-manager, who is the primary source of both R&D and business knowledge. However the owner-manager established 'top down' general objectives for a three year period, involving the goal of entering into the Brazilian market of fashion accessories, although it was only afterwards that the question of how to sell and promote the company's products to this new market was developed through informal and simple planning. The company rarely acquired external knowledge as it merged with another company once in its history and only hired a single external expert (Art Director). Only occasionally it

[94] Maximum Premium, Pelcor: From Cork to the fashion world (January 31, 2013).

learnt new ways collectively by developing fresh strategies, as in the case of the recent merger with its former mother-company, which resulted in more production capacity.

The owner-manager has played a key role in encouraging team learning within the organization: "*A good manager should listen to their team and decide accordingly. They should never decide alone*."[95] She has adopted a proactive approach in acquiring new R&D and business capabilities, for example through personal contacts (e.g. distributors), to gain market proximity and meet client needs: *"In the end it's me who travels and visits clients to sense business trends and thereby adapt our products to those needs"*. (Pelcor, owner-manager); "*The marketing efforts of Pelcor's owner-manager are notorious as she developed partnerships with designers and companies including Moda Lisboa and Lisboa Fashion Week, to develop exclusive products."* (APCOR).

5.7.4. Learning outcomes

Table 5.18 summarizes the capabilities and competitive advantages that resulted from these learning processes. The main outcomes were the new business capabilities in international networking and the additional strategic flexibility. By inter-organizational learning, it improved its international business knowledge in terms of network, marketing and customer preferences. Conversely, by merging with Novacortiça, the company was able to acquiring ('grafting') further capabilities, while also maintaining its small/flexible core productive team.

The company has also developed its capabilities 'by doing', for instance in improving in terms of taking advantage of public support[96] and enhancing its design and production capabilities to reduce the risk of increasing imitation from competitors.

[95] Maximum Premium 10/25/2012
[96] E.g. QREN funds, in order to internationalize further.

Table 5.18 PELCOR Learning outcomes

New capabilities	Competitive advantage
Business capabilities in international marketing / networking; New production and R&D capabilities through merging;	Small, flexible and manageable structure; Diverse and specialized business portfolio; Increased reputation;

These capabilities allowed the firm to respond rapidly to challenges and opportunities, including through continually adapting and innovating in its product range (e.g. perfumes, adornments and other lifestyle products)[97]. Secondly, it enabled it to enter into new businesses because, in the meantime, it mastered new R&D/design capabilities, acquired more production capacity, and gained a reputation. The firm's entrepreneurial capability is therefore relied heavily on its owner-manager's skill in sensing and selecting opportunities and synchronizing the firm's overall response.

5.7.5. Summary

The Pelcor case study highlights the effects of domestic resources and entrepreneurial experience on the firm's international performance. The company was a manufacturer that took advantage of its experience in a Portuguese traditional product and relevant public aid in order to internationalize, and became specialized in high quality consumer products. Additionally, internationalizing was also a way to overcome the domestic constraints of small market size and adverse regulation while taking advantage of significant international demand for luxury products.

The owner-manager's experience influenced positively the firm's international performance by engaging in relevant learning, acquiring and disseminating business knowledge throughout the firm. Pelcor internationalized gradually and emphasised the in-house design function and the informal project partnerships to better match the client needs.

Over time, management functions that were fulfilled by the owner-manager have been distributed across a more professionalized organisation to better address the challenges

[97] The company was able to fulfil a client demand in no more than a year while in the past it could take up to three years.

of increasing internationalization. Nevertheless, the owner-manager remained central in terms of sensing, selecting and shaping opportunities and coordinating the separate functions and resources in order to achieve a unified response to reach markets. The dominant mode of learning was exploitative and efficiency driven, together with informal searching and networking.

5.8. MOLDENE

5.8.1. Introduction

Moldene started up in 1983 as a supplier to a large toy manufacturer, located nearby. It produced metal moulds and manufactured moulds (up to 18 tons), through conception, 3D projects, development and manufacturing (in plant). It manufactures moulds for plastic injection, to compression and other alloys (e.g. aluminium)[98] and is part of a highly localised moulds cluster of companies in the centre of Portugal.[99]

In 1990, it gained a large client from the packaging sector and an automotive client based in France. Currently, it principally supplies the automotive industry, but also other international sectors such as appliances, electronics/telecommunications, packaging and computers[100].

In 2000, the company started its activity of plastics injection moulding of small parts and has accumulated knowledge and experience in this specialist area. The firm also provides related services in design/engineering and rapid prototyping[101]. Moldene entered first the closer European and North African markets, with further internationalization worldwide only from 2012. Its business portfolio has remained largely unchanged, adding only occasionally some new automotive clients. In 2012, the firm obtained ISO certification and achieved a growth rate of 10% in employment and 40% in sales, fuelled by its main automotive industry client.

[98] Moldene – Corporate information (2013).
[99] The Portuguese moulds industry is centred on the town of Marinha Grande, 150 kilometres north of Lisbon.
[100] It exports mostly to Germany, Belgium, Spain, France, Brazil, US, United Kingdom and Morocco, having one single client based in Portugal.
[101] Moldene – Corporate information (2013).

5.8.2. Knowledge base, learning triggers and responses

Knowledge base

Table 5.19 summarizes the events which have triggered the learning within the company. The company's knowledge base was centred around the prior experiences of its three owner-managers. For instance, one of the owner-managers started as a trainee with the parent company and was subsequently promoted to manager. In the meantime, he attained linguistic training and was supervised by the founders, who already had substantial commercial experience. The owner-managers either worked in family businesses or were former employees of other firms: *"I have always been linked to the mould industry due to family reasons … from that I am an owner-manager and I execute commercial tasks*" (Moldene, owner-manager); "*Most of these owner-managers lack management knowledge as they were former technicians"* (Portuguese Association for the Mould Industry - CEFAMOL[102]).

The early push to internationalize required the owner-managers to develop their linguistic skills and organize strategic business units internally. By 2012, the company had attained substantial business knowledge through international networking and while building its client portfolio. Investing in R&D development allowed greater production capacity, tailored products and timely deliverance*: "Quality policy is based on customers' satisfaction regarding lead time, services and product quality"*[103]*;"It consists of an integrated approach based on diverse competencies to different markets"* (CEFAMOL).

Learning triggers and responses

Table 5.19 shows the main constraints experienced, namely the small domestic market size, competitive intensity, peripheral location and lack of domestic support, for example in terms of training. Moldene internationalized incrementally based on its core mould technology, diversifying into related businesses and in response to industry changes and successive client demands. It has remained loyal to its geographically close long-time clients.

[102] Portuguese Association for the Mould Industry, Manuel Oliveira, President, Interview in January, 24st 2013.
[103] Moldene – Corporate Information (2013).

The company's internal R&D capabilities and stable team, specifically at the design level, has been central to ensuring the quality of its finished moulds. Significantly, due to familiar ties among employees (e.g. the son took over his father's place in the company) "*the company's employees had lifetime employment and hardly changed, which is also true of other firms in the mould industry, in the region"* (Moldene, owner-manager). Moldene was able to respond to client needs, through different client project files in several formats and sizes, which were important to target specific clients, notably in the automotive industry[104]. It is worth mentioning that the Portuguese mould sector, in the midst of the recent downturn in the Portuguese economy and its slow recovery, presents a limited domestic market, compelling Moldene to internationalise since its start-up. Also influential has been an increasingly competitive demand for accuracy and more services (see section 3.5.3).

Table 5.19 MOLDENE Knowledge base, learning triggers, and responses

Knowledge base	Constraints experienced	Responses
Entrepreneurial industry experience and education in languages of Owner-managers (1983) International business networking; strategic flexibility (2012)	Delocalization of large client toy manufacturer to China;	Enter other more demanding and proximal client industries (1990); Invest in a design capacity (1990);
	Demand from a large new client;	Established a long-range and loyal partnership (1991);
	Difficulty in having local partnerships;	Centralize production capacity internally (1991)
	More demanding businesses; Peripheral domestic location;	Production of mould injection internally (2000); Recruitment of qualified employees (2000);
	Little international visibility of Portuguese mould industry	Increased the firm's marketing efforts (2000)
	Lack of institutional support for training	Held funded training sessions (2011)
		Create an additional commercial unit for plastic moulds (2012)

The interviews indicated that the company has been relatively conservative in terms of its strategy, seeking to maintain the same clients, reinforcing trust by close contact and adding related services to its portfolio. It had diversified principally to near European markets, within the automotive sector: "*we keep our business with that big enterprise*

[104] Moldene – Corporate information (2013).

both through the production of new moulds and by repairing the existing ones … being focused almost exclusively on the automotive client makes us very dependent on one single client" (Moldene, owner-manager).

Nevertheless, in 2011 it attempted to attain new clients in overseas regions: "*We are now starting to present proposals and budgets to Brazil and North America*" (Moldene, owner-manager). The highly demanding nature of the business in terms of product accuracy plus its peripheral location and distance from the complementary injection and mounting units, compelled the company to adopt a new mould injection technology and recruit qualified manpower[105].

Moldene has experienced the need to engage in domestic partnerships to achieve more production capacity, but it had to centralize all production capacity because: "*although the company often engages in informal partnerships by project, formal partnerships are extremely difficult to obtain with competitors as everyone is afraid of losing clients*" (Moldene, owner-manager). The firm was granted some European QREN funds to train its employees in the new injection technology, although the domestically available support was experienced as excessively bureaucratic and slow to access, thus limiting its contribution[106]: "*public funds target industries other than the mould industry and miss business opportunities due to time-consuming bureaucracy while regulation constantly changes; the ineffective aid from ICEP in promoting the domestic industry (e.g. outdated firms' database); and also the credit shortage, force the companies to self-fund"* (Moldene, owner-manager).

These domestic constraints compelled the company to increase its marketing efforts to meet new clients: *"No client places an order without knowing us before … the main difficulty consists in bringing the clients to our enterprise*" (Moldene, owner-manager). It has increasingly internationalized its strategic business areas and in 2012 created a strategic business unit for the plastic moulds. Moldene, in order to break away from the dependence on automotive clients, attempted to enter into the new client sectors of

[105] E.g. Portugal is distant from emergent markets and at the domestic level there is one single plant to build cars. The automotive industry delocalised to east, to countries such as Slovakia, becoming difficult to show directly the piece and the mould to the client.

[106] E.g. European funds from QREN (National Strategic Reference Frame) related to innovation support were expected to be available in 2011 but were still unavailable one year later, as the company needed to expand its operations. Moldene allocated one employee to address the external aid programmes in full time, due to its complexity and bureaucracy, while liquidity is little, bank credit is non-existent either, irrespective of how well-rated the enterprise is, and the interest rates are high.

electric industry and pharmacy, in which the moulds need to be injected in very special conditions of temperature and with specific machinery. It was unsuccessful with regard to the pharmacy market as it demanded new and expensive technology to produce smaller mould parts. In this way, the firm's procedures and equipment were principally oriented around continuous improvement.

5.8.3. Learning processes

The evidence shows that the company's experience can be represented as a configuration of learning modes based principally on the accumulated business experience of its top management and the product development skills of its team (Table 5.20). Interviews provide evidence that the company learnt principally at an exploitative level ('by doing') and also by searching external opportunities, networking with clients, planning at a business level, and occasionally training its staff. The management team were central to sensing new opportunities, this being particularly facilitated by members' good command of foreign languages and practical knowledge of the firm's functions (e.g. design).

In addition, and due to the technological complexity of the sector that requires internal collaboration, the management team, together with the design and operations teams, were also central in terms of selecting and shaping those opportunities. Hence, Moldene learnt by being proactive at the business and R&D levels, when improving two-way organisational learning between operations and design sections and continuously reviewing its procedures. For instance, the mould production starts at the commercial area, flows to project, to engineering and lastly to production. The business is based on potential projects supplied by the own client in partnership: "*We have been a certified firm since 2001 ... therefore our internal procedures are continuously reviewed ... we tried to do all the R&D tasks internally only outsourcing once in a while ... the core tasks are done inside the firm to assure a high quality to clients ... the new processes are mainly production and efficiency related … design and conception are paramount when we talk of innovation"* (Moldene, owner-manager).

At the inter-organizational level, the company has learnt principally through the searching and networking activity of its senior management. Its owner-managers searched for business opportunities at industry fairs and client meetings. For instance,

the owner-managers prospected and visited clients and the close face to face contact was considered as paramount as 70-80% of such contacts resulted in increased business. The evidence suggested that the management team played an important role in synchronising the temporal and spatial correspondence between the firm's and clients' capabilities i.e. in programming operations, being thus crucial in the development of the firm's EC.

Moldene networked with clients through partnerships to further disseminate external knowledge internally through meetings and training[107] thus connecting internal capabilities for opportunity realization: "*The networking has to do with the exchange of information with our clients*" (Moldene, owner-manager). However, Moldene did not seek to engage in R&D related partnerships and kept such core capability confined within the firm's boundaries. Similarly, the firm's business knowledge was limited to its core management team which did not resort to external consultancy advice as: "*we do not choose external consultants as we are the main consultants who do the prospective work abroad*" (Moldene, owner-manager). The firm was therefore conservative in terms of protecting its internal and external resources, retaining close oversight of its technical network and avoiding joint project working and the risk of sharing intellectual property and know-how (e.g. design related) with partners who are also potential competitors.

Table 5.20 MOLDENE learning processes

Learning modes	Knowledge	Learning scope
'by doing'	**R&D, Business**	**Owner-managers and team**
Searching	**Business**	**Owner-managers**
Networking	**Business**	**Owner-managers, team, partners, clients**
Planning	**R&D, business**	**Owner-managers**
Training	R&D	Owner-managers and team

Frequently occurring (bold) and occasional learning processes

Moldene has also learnt by planning through prioritising R&D planning and top management level involvement in this in order to anticipate demand; and by training in implementing new R&D knowledge (e.g. plastic moulding). The knowledge collected

[107] The clients follow the process and keep up with its phases, visiting the firm or at distance through photos and reports detailing how things were done. Also, the company provided different training actions to different firm functions to ensure some polyvalence of its employees, turning out more flexible the productive processes in terms of tasks programming - e.g. in the case of mould injection.

externally was set down in plans: "*We have both business and corporate planning made by owner-managers who coordinate all those needs and put them into an investment plan*" (Moldene, owner-manager).

The company has relied mostly on efficiency adjustments. "*Business and R&D knowledge were often combined*" (CEFAMOL) through organisational learning by which: "*the exchange of information is constant*" (Moldene, owner-manager). Yet, the company rarely learned new ways as a result of its experiences of implementing change, as for instance when a new technology unit of mould injection was adopted: "*We never abruptly change the rules of the game; it is not possible … Only some processes are changed along the manufacturing chain*" (Moldene, owner-manager). The need to be accurate left little scope for learning experimentally by trial and error or improvising new products and processes, and the trust-based established relationships with long-term clients did not allow for imitation. Moldene was very judicious in providing a product aiming at fulfil a precise client need (e.g. part accuracy).

5.8.4. Learning outcomes

Table 5.21 shows the firm's principal learning outcomes in terms of design and international business capabilities and net contribution to the firm's reputation/track record that resulted in accuracy and a flexible business portfolio as key competitive advantages.

Through its ongoing involvement in R&D, continuously improving, and learning intra-organizationally, the company was able to achieve flexible core capabilities at the production and R&D levels, which enabled the fast production of complex moulds to clients with different needs[108]. Those capabilities led to process certification (e.g. ISO) and subsequent gains in reputation and client loyalty. The company has been able to increase its production capacity through the acquisition of heavy machinery (e.g. milling and adjustment capacity). It also achieved a quality control process that allowed it to allocate a machine to produce and test the mould accuracy immediately, whenever demanded.

[108] Moldene was a specialist in complex moulds to the automotive industry. Each mould is a distinct piece to fulfil distinct demands and the company was able to rapidly fulfil distinct client needs in producing and testing a mould of different and several parts - E.g. there were clients that order the part through an email file and further receive it in Morocco, France or UK.

Table 5.21 MOLDENE Learning Outcomes

New capabilities	Competitive advantage
Flexible core productive and R&D capabilities (e.g. design), which enables complex moulds; Mastering of R&D at mould injection and new international business related knowledge.	Certification, reputation and client loyalty; Increased productive capacity and control; A diverse business portfolio of complex moulds; Integrative accurate product / service and close market approach.

The new mould injection technology and the corresponding new business knowledge in its different client industries led to a more integrated and efficient approach, through more flexible design software and better quality control over the entire process: "the interaction *with the client before, during and after purchase is paramount ... the market has just selected the best performers ... which present the best service level ... the client arrives at the enterprise and knows that we control all the production process up to the end*" (Moldene, owner-manager). To summarize, Moldene has therefore built high levels of trust with clients and improved its product/service quality to meet exacting client demands.

5.8.5. Summary

The Moldene case study highlights the effects of firm's learning processes which have been largely centred on the characteristics of its internally-based R&D capability and also the owner-managers' entrepreneurial experience on the company's learning path. The firm's learning has been largely incremental in character, internationalized step-by-step and rarely engaged in complex change. Its decision-making was largely centred on the top management team, although it has become more collective following the firm's more recent restructuring, which has seen the design function being accorded a greater priority and influence.

The company has principally responded to competitive events and constraints resulting from its peripheral location (such as client delocalization to distant regions, the firm's limited international visibility, distance from European markets and dependence on a few long-term clients) by engaging in long-term partnerships, investing in its design function, centralizing production, and investing in new technology. Moldene achieved its flexible core capabilities by integrating and learning from the different views of

external clients and internal business and R&D functions. This has enhanced its entrepreneurial capability to pursue opportunities and achieve competitive advantage.

However, it remains dependent on its foreign automotive clients. For instance, Moldene tried to enter into the pharmaceutical market to break away from this dependence but was unsuccessful, as it demanded new and expensive technology to produce the smaller moulds needed. Organisational learning occurred through a combination of external and internal learning modes in which the owner-managers played a collective role in coordinating the internal team's R&D and business knowledge by networking inter-organisationally, searching for opportunities and settling goals for 'top-down' implementation. This company co-developed its products with clients, although it has not openly shared its design capabilities, nor engaged in formal strategic alliances.

5.9. SOMARQUES

5.9.1. Introduction

This company is a manufacturer and designer of high standard and customized ladies footwear located in Oliveira de Azemeis, an important footwear cluster 50 miles from Oporto.[109] It was founded in 1973 and developed exports of around 75% of overall sales, mainly to markets in the UK, Germany, France, Spain and Ireland. SOMarques was established by the three current owner-managers, who were initially a former employee, a bakery owner, and an employee of another shoe producer.

The challenges faced by the firm included:

- The loss of major clients as they switched to cheaper suppliers in the East in the 1990s, with most well-known brands moving to China with its lower production costs, thus causing many Portuguese suppliers to shut down.

- Increasingly global competition and an inability to compete on the basis of low prices compelled SOMarques to restructure and incorporate the additional design capability needed to produce small series of quality, customised shoes for high-end export markets.

[109] The footwear industry is highly concentrated in the north of Portugal in two main clusters: Felgueiras in the east and Barcelos in the west, representing half of the industry's employment at a national level. Another hub is located on the southern boundary of the northern region, centered on Oliveira de Azemeis and Santa Maria da Feira, accounting for 42% of employment.

- The company experienced a particularly difficult year in 2011 due to excessively hot weather that lowered the demand for winter shoes.

- In 2012, its owner-manager was considering a restructuring of the enterprise and significantly reducing the workforce from its then 50 employees. The firm forecasted zero sales growth (by the end of 2011), compared with 30% growth in 2010 and 35% a few years earlier.

5.9.2. Knowledge base, learning triggers and responses

Knowledge base

Table 5.22 shows that at the start the company principally held industry knowledge, mostly based on the prior experience of its founding owner-managers with almost no engagement in collaborative partnerships. The: "*owner-managers have good management knowledge and are aware of marketing trends"* (Atlanta, sales manager[110]). This core business experience has been supplemented by additional R&D capabilities, namely at the design level: "*design is a core capability ... that allowed being flexible and selling in quality and small series ... it is done internally"* (President of the Portuguese Footwear, Components, Leather Goods Manufacturers Association - APICCAPS[111]). By 2012, the company had increased its product development capability to meet a tailored small series demand from high quality markets, developing and producing, simultaneously, different shoe models.

Learning triggers and responses

Table 5.22 summarises how SOMarques has responded in the face of domestic constraints, mostly to the small size of its domestic market, in which nearly 90% of the overall footwear production of the Portuguese sector was exported (APICCAPS). There was a deficit of public support specifically designed for the footwear sector since most interventions did not target this specific sector, whereas the European aid programmes (e.g. QREN funds) either targeted other industries (e.g. cork) or were experienced as very time-consuming to apply for and access, often missing the moment for a business opportunity. The company experienced permissive import laws regarding cheap eastern

[110] A firm's supplier of soles, José Luis, Sales Manager, interview in January, 7st, 2013.
[111] APICCAPS, interview in July, 22st, 2013.

products that did little to protect national products and rigid labour regulation in terms of hiring personnel that limited its flexibility to recruit and dismiss staff.

Table 5.22 SOMARQUES Knowledge base, learning triggers, and responses

Knowledge base	Constraints experienced	Responses
Owner-managers with domestic firm and industry experience (1998);	Small market size; Lack of public support; Bureaucracy in European funds; Shortage of manpower and training;	Internationalized to near markets (1990); Resorted to experience (1990); Self-financed (1990); Recruited (1990);
R&D on design; production flexibility and market knowledge (2012)	Competitors' delocalization to East; Intense competition from low cost Asian products;	Adopted quality tailored products (1991); Offered better payment conditions to European clients (1991); Increased service level (1992);
	Lack of production capacity;	Outsourced production capacity (1973-2012)
	Global economic turmoil; Seasonal variability of demand for products (i.e. abnormal Oct. 2011);	Restructuring and reduced staff (2012);

Significant difficulty was experienced around the recruitment of competent staff, because the industry was considered 'dirty' and less attractive particularly by young people, and because vocational training specifically for the footwear industry was rare in Portugal. This problem compelled the company to recruit and train staff from further afield rather than from the immediate locality.

The domestic VAT regulation and unfavourable payment conditions were deemed major constraints and a problem for the firm's financial position. The Portuguese tax policy (VAT) required payments irrespective of a firms' profit, often resulting in over taxation. As the international crisis deepened, prices fell and payment conditions worsened.[112] Significantly, however, the Portuguese economic crisis has not substantially harmed the industry: "*As in 2012 Portuguese firms are 90% internationalized and exports are growing 5%,; the credit shortage ended up favouring the Portuguese firms which sell small series with attractive payment conditions to near*

[112] Some important clients were paying within 60 days instead of 30 days as they used to before. However, if the client ordered from China it had to be a substantial product quantity, 6 or 7 months in advance and with payment bu credit card, which increased costs and risk.

European clients, who became short of credit to buy from distant East suppliers." (APICCAPS).

Interviews with the owner-manager provided evidence that the firm addressed these barriers by self-financing, relying on previous business experience and building closer relationships with clients: "*we could always export to Spain for instance while today the crisis is systemic and the lessons learned are of little help*" (SOMarques, owner-manager); "*certification and financial capacity (e.g. credit insurance) were mandatory conditions to do business"* (Atlanta, sales manager).

Additionally, the generalized European crisis compelled Portuguese firms to internationalize to emerging markets (e.g. Brazil) and attain greater closeness to clients, in order to develop rapidly tailored shoes and to improve payment conditions[113]. In this way, SOMarques was able to customise the product to fulfil specific client demands: *"we bet on shoes entirely in leather and suitable for different groups of customers.*" (SOMarques, owner-manager).

The low-cost competition forced SOMarques to adopt a quality strategy, investing in design machinery[114]and becoming specialized in high quality tailored shoes[115]: "*the previous investment in capacity allowed Portuguese firms to be flexible and sell in quality and small series"* (APICCAPS). The company became a specialist in certain nearby markets (e.g. fashion retail), while maintaining loyal, long-term clients[116]: *"First, we try to keep the existing clients, improving the corresponding service level and second, we try to obtain new ones.*" (SOMarques, owner-manager). As previously discussed (section 3.5.4), Portuguese footwear exports have targeted high value-added niches in order to counter the aggressive pricing of Chinese competitors. There has been an increasing focus on R&D projects, both in process and product technologies that enabled the rapid production of small series and more flexible responses to customer orders within a Portuguese competitive edge based on proximity to European markets and the corresponding high service level expectations of customers.

[113] Clients who worked with rapid orders have the prototype within 1-2 weeks, after an initial personal approach and sample production, and obtain the final product within 1month. The company presented a good service level because it responds fast to demands.
[114] E.g. acquisition of a new drawing machine CAD CAM, to better and more quickly design products.
[115] The company adapts little details of conception and the shoe molds differ through different clients. There are clients who prefer a softer shoe, others want it more comfortable or with a taller caper.
[116] Some clients had been with the firm for 25 years.

Although the company was equipped with flexible production and design equipment, it addressed the demand peaks by contracting external production capacity[117]: "*We have smaller factories to which we supply manpower and raw materials and have people supervising the process"* (SOMarques, owner-manager); "*many firms do fix unexpected problems by recourse to occasional partnerships"* (APICCAPS).

Lastly, due to an unexpectedly hot October 2011 which caused a significant decrease in sales, the firm responded by adjusting its programming and reducing staff. Such measures proved insufficient to transform the business performance.2012.

5.9.3. Learning processes

Table 5.23 summarizes the firm's key learning processes. The company learnt principally by improving on its current procedures (i.e. 'by doing') and also by searching for client needs, networking occasionally during demand peaks, imitating the competition and improvising rapidly new products, in which the role of the owner-manager was central, both in terms of developing and limiting the firm's entrepreneurial capability. The firm has seldom learned how to master radically new procedures as a result of its failure to engage in more significant and complex changes.

The evidence indicates that SOMarques learnt by taking action, through routine procedures, at the business level in which both internal and external knowledge were shared by the management team: "*We communicate on a daily basis … we are not as formal as in the big enterprises ... We identify opportunities and we implement our decision without the need for constant meetings and memorandums"* (SOMarques, owner-manager). Incremental exploitative learning occurred constantly, notably in response to client demands, setting operational plans, and resorting to past successful solutions: "*the firm adapts to the trend rather than changing in a revolutionary way*" (Atlanta, sales manager); "*the procedures are always the same*" (SOMarques, owner-manager). Such learning occurred principally at senior management level: "*the business knowledge was confined to the top management team and goals flow top-down* (APICCAPS)"; "*the owner-manager centralizes all the business competencies and managerial skills, the senior management team interacts through occasional meetings"* (Atlanta, sales manager).

[117] The company had the capacity to produce 400-500 shoe pairs per day, maximum, which made it difficult to respond to more demanding and distant regions.

Table 5.23 SOMARQUES learning processes

Learning modes	Knowledge	Learning scope
'by doing'	**R&D, business**	**Owner-manager and team**
Searching	**Business**	**Owner-manager**
Networking	Business	Owner-manager, partners and clients
Imitation	Business	Owner-manager
Improvisation	R&D, Business	Owner-manager and team

Frequently occurring (bold) and occasional learning processes

The firm networks occasionally at the business level. The process was highly centred on the owner-manager, who had cultivated close relations with clients. For instance, the owner-manager had spent a lot of time sending samples to potential clients, going to fairs, to centres of fashion such as Italy, visiting the clients personally to gather ideas with respect to a new product. He met other competitors and clients informally at trade fairs and distributed the information internally into the firm. The company often outsourced non-core functions such as the dressmaking to partners in India or Northern Africa: "*We did not used to engage in partnerships but sometimes we talk, and realize we could make some improvements*" (SOMarques, owner-manager); "*good partners, either clients or suppliers, are key to keep up with the business*" (APICCAPS); "*there exists networking in terms of production"* (Atlanta, sales manager).

Networking has been combined with searching activities, but with the associated learning and selection of opportunities confined to the management team. The search for potential new clients was conducted remotely, using email and telephone contact, with shoe samples then being exchanged by mail. Ongoing interactions with prospective, new and long standing clients have been constant and ongoing, with the owner-manager often visiting clients directly : "*The owner-managers are proactive in searching for new markets ... firms need to be proactive in searching for alternative markets to Europe that is not going to grow soon"* (Atlanta, sales manager). The resulting external knowledge was further introduced at the top management team's level: "*Firstly, the decisions are always taken by our three owner-managers together and secondly each one manages his expertise area the best he can*" (SOMarques, owner-manager).

The company has also learned by imitating the competition, again largely through the owner-managers who occasionally collected relevant benchmarked knowledge (e.g. the identification of fashion trends), adjusting designs to meet different clients' needs: "*We do not have brands here - we copy a little from each brand*" (SOMarques, owner-manager)"; "*it imitates by following some successful competitor initiatives and the fashion trends*" (Atlanta, sales manager). Occasionally, in the face of unexpected changes, the management team also improvised a new shoe, based on sporadic client demands, rapidly and conjointly with the design section: "*it improvises when it needs to develop a new product in the short time in which the design function is paramount*" (Atlanta, sales manager).

To summarize, the main responses to various external challenges and constraints have been incremental, taking action experientially, with top management being largely responsible for orchestrating internal (e.g. design) and external (e.g. production partnerships) resources, but with occasional input from R&D and production levels: "*our orders are to be filled within two months and we can only plan within this time span; from this point on things come up repeatedly*" (SOMarques, owner-manager). The company did not plan business goals in the long-term due to the seasonal characteristics of the business.

5.9.4. Learning outcomes

Table 5.24 summarizes the new capabilities and subsequent competitive advantages achieved. The firm has invested in new technological capacity to better meet client demands through a tailored design function, thus augmenting its ability to respond to varied demands[118] and has also shifted to a more consensual decision-making process that has also proven to be more flexible in responding to opportunities. Specifically, the company has attained greater proximity to clients and increased the quality and responsiveness of its service level, speeding up its completion of orders. SOMarques has retained long-standing traditional clients over time and became specialized in

[118] The company created a new mould each new season in order to accomplish distinct demands. For instance, one person could boot size 37 but he / she may have a more or less elevated foot, which demanded a specific product.

certain markets, allowing it to better address the needs of large international distributors[119].

Table 5.24 SOMARQUES Learning Outcomes

New capabilities	Competitive advantage
More flexibility in design, production, and decision level; More specialization in market niches; New capabilities in networking with large distributors;	Diverse and flexible portfolio of customized quality products; Certification; Improved service level; Client loyalty;

Somarques' entrepreneurial capability, primarily based on production flexibility and specialization in high standard markets, enabled the business to supply a fully custom-made product and build loyalty because of the improvements gained in timely product delivery and clients' payment conditions: "*Clients who work with rapid orders demand the product today*" (SOMarques, owner-manager). Lastly, continuous improvement in specialized markets led to certification of its processes and products, enhancing its reputation and contributing to its competitive advantage.

5.9.5. Summary

This case study highlights the positive effects of the owner-managers' previously acquired industry orientation on the firm's response to the competitive challenges faced and subsequent learning processes and performance.

The owner-managers have followed successful past strategies through a decision-making process confined to the top management team, which had set goals and gathered knowledge to be implemented 'top-down', throughout the firm. This role of knowledge gatekeeper was important, demonstrating a very market-driven positioning. However, their past experience did not include up to date international business knowledge to deal with current, new constraints.

The approach to knowledge management has been informal, rather than professional and systematised. Learning has largely been experiential in nature and through

[119] The company affiliated with three other firms that produced either the whole shoe or only part of it. It also outsourced galoshes in China and India and further finished them internally, adding the sole.

continuously improving existing procedures (i.e. 'by doing'), within team and intra-firm scopes. However, the company has, from time to time, engaged in more open modes of learning, through business searching, networking and inter-organisational production partnerships. Such incremental behaviour was shown in the face of the current economic crisis, by carrying out a restructuring that sought to produce more of the same and cut back on staff. The investments in new technology and capabilities were not sufficient to overcome the difficulties of its highly competitive context and in 2012, the firm was suffering falling sales and was on the verge of shutting down.

The company's learning outcomes concentrated on a certified, customized, and flexible product/service, and on subsequent client loyalty. It was able to develop enhanced capabilities relating to flexible design, marketing awareness, and dealing with large international distributors. Increased flexibility and speed in decision-making within the top management team, partly because of informal knowledge sharing, became apparent. The firm's core production, design and management capabilities were, therefore, complemented with external marketing knowledge, which was essential to maintain a high service level and closeness to clients. The owner-managers were essential in promoting this strong market focus and openness to innovation.

Moreover, the management team was central to building and limiting the firm's entrepreneurial capability. It sought and experimented (e.g. by improvising) with new design possibilities but mainly within the confines of the firm and its traditional industry. It selected and chose, based on prior experience, which products to select for which markets and in relation to the firm's existing design capability. It further connected internal and external elements by networking informally or by imitating competitors. This process tended to be exploitative, always led by the owner-managers, although with occasional important input from the design team.

5.10. ACSMV

5.10.1. Introduction

Adega Cooperativa de São Mamede da Ventosa (ACSMV) is located in Ventosa, Torres Vedras, 80 miles north of Lisbon. It produces liqueur and fortified wine from grapes

from the vineyards of its associates[120]and was founded in 1956. In 2011, it was ranked 1st in Portugal in terms of its wine productive capacity and the 12th in terms of exports,[121] employed 38 people and exported 95% of its production.

Up to 1990, the company sold bulk wine to storekeepers and other wholesalers within Portugal. However, as global competition intensified and tariffs fell, other brands entered into the Portuguese market and domestic clients started buying wine from the border region of Spanish Estremadura. In 1996, facing a shrinking domestic market, the company realized it needed to produce bottled wine and search for international clients.

Since 2000, in order to assist the international repositioning of the business, the firm has had four investment projects, plus two successful applications to the European Agricultural Funding Programme (PROAGRI). In 2001, the firm invested in equipment capacity, ended up bottling and putting all the production into packs, instead of exporting it in bulk. It gradually built up its export markets and internationalized incrementally, first to Angola and Mozambique, building on its domestic experience, productive capacity and the advantage of its low prices. In 2011, ACSMV attempted to enter other countries, such as Brazil and China, but faced protectionism as well as limitations to its ability to cope with large scale production and associated logistic. In 2011 its sales fell sharply in respond to the global economic crisis.

5.10.2. Knowledge base, learning triggers and responses

Knowledge base

The company has accumulated considerable industry knowledge, with its owner-managers having many years of experience in the wine industry[122]. Further learning and development has been focused on searching for new clients and improving productive efficiency in response to its competitive difficulties (Table 5.25). As the owner-manager explained: "*anr important issue is the years of experience we acquired in this business along with some contacts … and we were lucky in having a core client who had businesses in Angola and contacted us … there aren't any ruptures with the past. We*

[120] More than 2000 members in 2012 with vineyards covering a total area of 4885 acres.
[121] It processes up to 16,500 tons of grapes yearly and holds a storage capacity of 39 million litres.
[122] The owner managers held in average only secondary studies. One of them was the president of Federation of National Collective Cellars (FENADEGAS) during four years and its paymaster during six years, which provided deep knowledge about the industry.

simply are improving continuously" (ACSMV, owner-manager). By 2012, as a result of its business overseas, the company had absorbed important knowledge related to quality control and international business.

Learning triggers and responses

Table 5.25 shows the main domestic constraints experienced and subsequent responses. Specifically, ACSMV faced domestic constraints in terms of the small market size, unfavourable payment conditions, difficult partnerships, and the regulations and legal framework affecting the sector. As discussed previously, (section 3.5.5), the Portuguese wine sector tends to be characterised by a conservative approach, particularly with respect to innovation (e.g. in terms of developing new packaging, new formats and products) and small wineries that avoid moves towards greater concentration through collaborative partnerships with learning tending to be incremental and centred on owner-managers.

The small domestic market is characterised by intense competition from foreign brands. Like other Portuguese wineries, ACSMV encountered difficulties in collecting payments which threatened the financial sustainability of the firm[123]. It also struggled to develop cooperative local partnerships with other similar enterprises. Contributory factors here included the lack of a culture of inter-organisational cooperation within the sector, as well as concerns that potential partners were unable to meet the minimum quality criteria[124]. The company had attempted to develop such cooperation as a means to expanding productive capacity in response to occasional demand peaks and to accommodate large scale international demand: "*Wineries have their own structures and although they may be idle, they avoid association with other wineries … every competitor conceals information."* (ACSMV, owner-manager).

Since 2000, the domestic regulatory and legal framework has been in a state of constant change, becoming more bureaucratic regarding licences, certification and environmental issues. These processes have become more time-consuming and expensive for

[123] The internal market represented only 5-6% of the firm's total revenue because there were plenty of brands, an enormous number of bottlers and many low cost competitors from countries such as Bolivia and Chile.
[124] For instance, some wineries presented out dated technology that deteriorates the wine quality.

businesses[125]: "*You simply cannot imagine the time the new licensing process took us to meet the new rules that are always changing and the investments we were obliged to make*" (ACSMV, owner-manager). Access to European funding programmes (e.g. PROAGRI) was also experienced as increasingly difficult and prolonged, although the company, taking advantage of its owner-manager's experience, was successful in its application to the PROAGRI fund. This enabled it to obtain significant investment funds that were applied to improving production capacity and also improved the possibilities of being successful in further applications as it developed familiarity with these funding procedures.

Table 5.25 ACSMV Knowledge base, learning triggers and responses

Knowledge base	Constraints experienced	Responses
Previous industry experience (1956);	Difficulty in selling domestically due to local competition; bad payment conditions; difficult domestic partnerships; increasing regulations and legal burdens.	Internationalize (1996);
High quality control processes; international network business knowledge; (2012);	Lack of international business knowledge; Good image of Portuguese wine;	Internationalize to Portuguese speaking and culturally similar countries (1996); Resort to local distributors and international partnerships (1996);
	Need of capacity and marketing efforts; Aid of European funds; Old age of the associates;	Investment in production and storage capacity (2000); Use of customized product (2001); Internationalize further (2011) Recruit and train qualified younger people (2011);

ACSMV was compelled to turn to new markets overseas. It entered first into culturally similar Portuguese-speaking markets, taking advantage of the image of Portuguese wine as a traditional product, and then entered into European and more distant markets, such as China. ACSMV internationalized through attempting to strengthen its approach to marketing, building on its past domestic experience with local distributors: "*our contacts are mostly local, with wineries from the vicinity*" (ACSMV, owner-manager).

[125] The owner manager complained that the EU requirements became excessively restrictive once transposed to the national law and were constantly changing (e.g. the company had a previous licensing for wastewater, but needed to apply for a new licensing because a new decree came out, which forced it to build a new plant to treat wastewater).

However, the company's internationalization process was hindered by a lack of understanding of international markets and related issues, as well as the absence of any 'new blood' in its management team and the firm's limited production capacity. The changes made tended to be slight modifications in the product and packaging (e.g. product labels) including the introduction of tetra pack technology to better serve some international markets: "*while, in Brazil we sent high quality wines, in Angola they more likely can only afford low quality wines, mostly in Tetra Pack containers*" (ACSMV, owner-manager). The firm also required an expanded production capacity, in terms of storage and bottle filling capacity, as the absence of this delayed the completion of international orders[126]: "*At this point we have reached our limit regarding productive capacity ... we can only sell more if we resell wine*" (ACSMV, owner-manager). At the time of writing, the company was in the process of recruiting qualified younger managers and operational staff, in order to replace its aging workforce and improve its international competitiveness.

5.10.3. Learning processes

The focus of learning and development in ACSMV has been on incremental improvements to existing procedures ('by doing'), attempts to target new potential clients by experimental trial and error. More occasionally it also sought new business opportunities, through networking with distributors, and investing in training for operational staff (Table 5.26). The company provided little evidence of seeking new products and processes and favoured the exploitation of immediate opportunities through incremental change. Improvements in routine procedures were achieved through 'learning by doing', with regard to both R&D and business practice, with the aim of realising economies of scale: "*there aren't any ruptures with the past ... we simply are improving continuously, for example in the process of freighting the containers, or in the use of pallets"* (ACSMV, owner-manager).

The firm demonstrated a relatively unsystematic and unplanned process of learning by experimental trial and error, and of selecting, approaching and shaping internal capabilities towards international markets. For example initially the owner-manager sent wine samples to potential clients and then waited to be approached: "*In the*

[126] The company successfully applied for QREN funds and did three investment rounds in terms of production capacity.

meanwhile a contact with Mozambique came up and things started going well, then let us see Angola … we launched the new wine that could succeed or not … I don't know how things will roll with Brazil" (ACSMV, owner-manager). This strategy has been principally confined to the top management team, with little evidence of learning from external viewpoints to address business issues: "*I, another colleague of mine, and another member of the board constitute the backbone of people that have driven this winery ... we have constant monthly meetings with several cellars ... the skills to product/business development are much centred on the management team ... the leadership is not participative, rather 'top down'"* (ACSMV, owner-manager).

Occasionally, the owner-manager undertook limited research in order to anticipated market trends via the internet, trade fairs, and meetings: "W*e are aware of the news and we have the concern to verify if we could accomplish them or not ... we are always adapting, according to market needs"* (ACSMV, owner-manager). Sporadically, the firm networked at an inter-organisational level, with external distributors[127], whose feedback was used in updating the firm's business purposes: "*We listen to the distributors, about what goes well or wrong"* (ACSMV, owner-manager). Sometimes, the firm carried out training sessions for its operational staff (at the R&D level[128])

Table 5.26 ACSMV learning processes

Learning modes	Knowledge	Learning scope
'by doing'	**R&D and Business**	**Owner-managers**
Trial and error	**Business**	**Owner-managers**
Searching	**Business**	**Owner-managers**
Networking	Business	Owner-managers and distributors
Training	R&D	Owner-manager and team

Frequently occurring (bold) and occasional learning processes

The firm's long term strategic planning has been limited to its financial plan and operations, with opportunity realisation centred on its management team. This lacked any formal strategic approach: "*we programme operations according to needs, to avoid*

[127] The contacts with distributors are very informal and carried out by the owner manager, who occasionally goes to wine fairs and meetings and travel to Angola and Mozambique to personally meet clients.

[128] The company took advantage of QREN funds to training, either in hygiene and safety at work, or industrial equipment.

excessive stocks and financial shortfall" (ACSMV, owner-manager). The company rarely engaged in more radical re-thinking of its established practices and the basic assumptions underpinning these. The two occasions where it did do this comprised changing its strategy and structure towards internationalization (1996), and the renewal of its management team (2012). Overall the firm displayed considerable conservativism in approaching opportunities and rarely sought novelty.

5.10.4. Learning outcomes

Table 5.27 summarizes the principal capabilities and competitive advantages achieved. ACSMV attained business capabilities at an international level, and operational capabilities in terms of quality control, production capacity and certification. It internationalized late and by 2012 was more market-oriented and focused on customized products. This adjustment to serving international markets compelled it to attain additional capabilities in tailoring products to these different markets[129], increase its dealings with international distributors, and master new processes (e.g. the tetra pack technology).

Additional investments strengthened the business asset base, which together with new knowledge through applying for European funding, made it easier to apply for further funding programmes. For instance in 2011, the company successfully submitted two applications to PROAGRI and one application to PRODER (Program for Rural Development), enabling investments aimed at improving the quality of bottling, quality control and storage. The firm bought a new bottling and filling machine, a machine that grades the quality of the grapes, forklifts and a new production line: "*Once we understand how the project's approval works and its mechanisms, it gets easier to move.*" (ACSMV, owner-manager). These new capabilities in applying for funding have enabled it to strengthen its productive capacity and its ability to respond to the demands of international markets[130].

[129] E.g. during 2011, the company changed the labels of all its wines, created the wine 'Terras de Agostinho' (Lands of Agostinho) and applied for the registration of the new brand 'Adega de São Mamede' (São Mamede Cellars).

[130] E.g. in 2011, the company acquire six additional tanks of 264 000 litres of wine each and another one with the capacity for 1 000 000 litres.

Table 5.27 ACSMV Learning Outcomes

New capabilities	Competitive advantage
Business knowledge on dealing with international markets; Business knowledge on networking with international partnerships; New productive, R&D, and marketing processes; Knowledge on dealing with European funding aids;	Close market approach; Certification; Tailored product; Productive capacity;

Because of these additional investments, the company became certified, created new wine brands and increased its reputation. Despite these efforts, in 2011, results fell short of expectations. Sales growth rate fell from 27% to 4%, illustrating the firm's limited success in addressing the challenges posed by a difficult and highly competitive international environment: "*Well, it isn´t easy, because this is a global market with many people making wines and it is not easy to gain, from night to day, new markets"*. (ACSMV, owner-manager).

5.10.5. Summary

This case study highlights the firm's late entry into international markets; a trait common to many smaller Portuguese wineries. The firm's experience was production-centred and confined to the top management team. The drive to internationalise the business has involved networking and searching for new business opportunities, albeit unsystematically, through trial and error, and with only a limited positive impact on the firm's performance. In this way, the firm exported first toward culturally similar countries, through local distributors, which had limited success. The competition issues faced at international level and the lack of production capacity, business knowledge and potential domestic partnerships, resulted in serious barriers to the firm's growth.

The firm's learning process was principally based on exploiting previous domestic experience and improving the efficiency of existing practices in response to the most immediately recognisable existing opportunities. The firm's networking and searching activities (at the business level) was centred on the owner-manager and relied upon the clients' and distributors' commercial feedback. This constituted an important input to innovation and helped to update the company's entrepreneurial capability. Two-way

learning was mostly at the top management and business levels, but occurred only rarely at the organisational and inter-organisational levels.

The management team was central to the firm's entrepreneurial capability. It centralized all the firm′s business tasks as it sought new clients, distributors and overall opportunities; once the opportunities were seized, existent resources and capabilities were shaped (e.g. extended production capacity) and internal capabilities (e.g. knowledge of the domestic market) were connected to external elements (e.g. culturally close markets). In the end, the top management team led the organising of firm′s EC with little or no contribution from the firm's remaining units.

In 2011 the firm's sales fell abruptly, despite its investment in additional capabilities in new processes, new knowledge on how to deal with public aid, international clients, and partnerships. These poor results led to the top management team being replaced. However, it had achieved an improved competitive position in terms of productive capacity, certification and international marketing. The firm's 'openness' in terms of innovation was limited to the acquisition of state of the art equipment and external commercial knowledge, principally from distant distributors. Conversely, the company rarely interacted with other similar enterprises with a view to developing co-operative efforts and capacity at business and production levels.

5.11. Conclusion

This chapter has analysed the role played by previous knowledge, whether R&D or business driven, and environmental constraints in shaping firms' responses and subsequent learning processes and outcomes. It shows that the owner-managers played a central role to varying degrees in terms of organizational learning and the shaping of the firms' entrepreneurial capabilities. Evidence showed that owner-managers nurture, and sustain the overall firm's EC rather than simply motivating particular individuals or sections to innovate. Hence they are crucial in both external and internal learning modes, based on R&D and accumulated business knowledge.

The chapter contributes key insights on the constraints that face Portuguese growth-oriented SMEs and how they have sought to address them. Increasing internationalization was repeated throughout the nine case studies as a central theme, while some developed through engaging in change of a more strategic nature, others responded with more limited operational adjustments. Many of the cases presented outcomes in terms of higher quality and more differentiated products/services that targeted specific markets (in which R&D and design played a role), instead of a low priced, undifferentiated product.

The varied responses to the challenges and opportunities faced can be understood in terms of a complex interplay of contextual and firm-level factors, including the nature of technological development within the sector and the markets involved, the resources and capabilities of the enterprise and availability of investment sources and other support, qualified staff, and partnerships.

It was found that learning was more effective in those cases that combined different modes of learning, which was also reflected in the different levels of 'openness' in terms of innovation and the nature of entrepreneurial capabilities. Searching and networking activities at an entrepreneurial level was key to the absorption of relevant external knowledge and updating of firms' entrepreneurial capabilities, while experiential learning 'by doing', was also a recurrent theme in exploiting opportunities. The owner-manager/CEO was often key in linking new external and internal, efficiency related knowledge for opportunity realisation, thus determining the firm's degree of openness with respect to how it approached innovation. Other learning modes, carried

out principally by the senior management teams (e.g. imitation), took place to varying degrees across different sectors. High tech companies in general were characterised by entrepreneurial capabilities that were wider in scope and more integrated, particularly emphasising systematic and explorative approaches (e.g. planning), whereas traditional firms tended to be less professional and systematic, relying more on exploitative learning modes (e.g. 'learning by doing') and at the top management level. The high tech cases, involving higher technological complexity, were also characterised by higher rates of change and learning, often involving a more dynamic approach to combining and synchronising resources and capabilities and being able to switch between both explorative high level and exploitative low level learning.

This first analysis was made case-by-case and the next chapter focuses on developing a cross-case analysis.

6. Chapter Six: Understanding learning in growth-oriented firms: cross-case analysis

6.1. Introduction

This chapter builds on chapter 5 by developing a cross-case analysis to compare and contrast the characteristics, processes and outcomes across the firms. The findings are presented according to the three key themes earlier identified:

a) Knowledge base, learning triggers, and responses;

b) Learning processes

c) Learning outcomes

These three themes are explored separately for the two main groupings of traditional and high-tech firms. Then, a cross-case section analyses the principal findings across all cases and finally a conclusion section synthesises the main patterns to have emerged.

6.2. Knowledge base, learning triggers and responses analysis of high-tech firms – cross-case analysis

Introduction

A number of key findings emerged from the previous analysis. First, these companies faced barriers which were mostly related to their peripheral location and which have played an important role in driving them to internationalize from an early stage. Thus, as they developed their businesses, they tended to search for R&D-related knowledge and to engage in networking with international actors relevant to their sector.

Second, the role of the domestic environment in providing highly educated human resources has also been a key supporting key factor in the growth process of these companies, particularly with respect to their R&D activities. However, all cases also experienced constraints arising from their domestic context, including limited opportunities for collaboration. As discussed in section 3.4, both ICT and biotechnology sectors exhibit highly institutionalised and goal-oriented R&D systems, with a generic nature to their underlying technologies, making them applicable to varied applications. At the same time, there were some significant differences between sectors in terms of

technological opportunities. While the biotechnology sector has a close reliance on scientific research and related breakthroughs, often emanating from universities, the ICT sector depends more on technological developments than on science *per se*, and on collaboration with downstream client industries. An important characteristic of the ICT sector is also the fact that firms benefit from network externalities. Innovation and the performance of firms essentially depend on how well they manage to integrate their products with clients' products. Thus innovation is highly systemic by nature and new markets are often created by firms themselves through platform technologies and critical interfaces between them (e.g. the case of Altitude).

Conversely, in biotechnology new innovative products tend not to be stand-alone rather than systemic, sometimes with a need a need to nurture new markets for the new innovative product (e.g. Bioalvo's natural extract library). Furthermore, the product approval process in biotechnology is more heavily regulated and lead times in application areas such as drugs tend to be very long (10–15 years). The two sectors are therefore in different phases of techno-economic development, with the ICT industry being in the deployment period of its technology, whilst biotechnology is much less mature[131]. Third, these companies addressed these sector-related characteristics by building core R&D capabilities and internationalizing their markets and investment sources. The high-tech companies, in particular, dealt with increasing competitive constraints by developing a flexible approach to different business demands, developing tailored solutions to different clients and customising their core R&D that embraced complementary clients' technology.

Initial Knowledge base

All the high tech companies were dependent on the strength of their R&D activities, as reflected by their yearly rate of introduction of new products. This strong R&D focus was also reflected in the backgrounds of their lead entrepreneurs/managers, educated to PhD level or having other relevant academic backgrounds. Bioalvo, for example, was strongly reliant on its previous owner-manager's informal networks, attained while studying abroad.

[131] A growth cycle that can range from an early irruption phase, when the new products and technologies are showing their future potential. to a turbulent phase with an intensive build-up of new infrastructure and new technologies and, lastly, a phase in which the new technologies are deployed broadly in the system, e.g. synergies between information and telecommunications, leading to a maturity phase, with different financial needs (Greiner, 1998).

The R&D teams were a central resource to these companies and had been recruited from the best graduates of domestic universities, namely engineers (in the software industry) and biologists (in the biotech industry). These companies continuously searched for external knowledge to complement their own R&D based knowledge, reflecting their openness innovation approach. YDreams, for instance, developed an alliance that became a spin-out for the entertainment industry (Audience Entertainment).

Final knowledge base

These initial R&D knowledge foundations evolved through the continuous improvement of core capabilities towards product customization and certification. R&D knowledge was patented and applied to various client sectors through custom-made solutions (e.g. software platforms) and deficiencies relating to lack of international business knowledge (most of the owner-managers were technologists) were addressed by recruiting external expertise and developing new client relationships and partnerships[132].

Learning triggers and responses

Table 6.1 summarises the constraints experienced by the high tech companies and how they responded, showing that all had internationalized early on while continuing to encounter various domestic barriers that hindered their development to varying degrees. Their owner-managers, however, showed a proactive posture, principally through being able to respond strategically to the critical challenges they faced. Biotecnol, for example, moved its headquarters abroad in order to achieve closeness to its key markets, affluent partners and financing sources.

[132] E.g. helping to access new sources of investment in the case of biotech.

Table 6.1 Learning triggers and responses at high-tech companies

Constraints experienced	Responses
Lack of business knowledge, including international marketing; Shortfall of local partnerships, including universities; Lack of domestic long term venture capital; Experiences of inefficient regulation and lack of public support for internationalization.	Acquire expertise through recruitment and firms' acquisition, and training of existing staff; Engage in international partnerships; Selling services, franchising, licensing; Raise international funding; Enhance corporate marketing efforts, externalize commercial activities and establish headquarters abroad.

Lack of international business knowledge

Some of these high-tech companies (YDreams, Bioalvo) had their origins in research projects that were initiated within academia and supported by the public sector, and were led by technologists with little commercial experience. However, their limited capitalization (both in terms of public shareholding and venture capital) was not compatible with the requirements of the software and biotechnology sectors for huge amounts of investment and long term ROI. Moreover, owner-managers, with their lack of business experience and knowledge, were ill-suited to meet the challenges of a highly demanding international environment. In order to address these deficiencies, and given the lack of domestic support, the business knowledge needed to operate internationally was acquired in a number of ways, including by hiring international managers, acquiring firms, holding training sessions, resorting to consultancy advice and mentoring and, in some cases, moving the firms' headquarters nearer to key markets.

The better resourced and more affluent companies (e.g. Altitude) were able to afford to move facilities near to important markets or acquired firms, in order to rapidly access key knowledge, whereas other companies could only afford to hire international experts, and only for a short period due to its high costs. Altitude, for example, acquired a Swedish company to better master its internet-related cloud technology whilst hiring an internationally experienced manager who successfully restructured the company. YDreams and Biotecnol also recruited international managers, although in both cases these appointments proved inadequate to the challenge of international networking and

relationship building with international clients, contributing to the decision of both to move their headquarters closer to primary markets in the USA.

The need to rapidly acquire external knowledge in support of rapid internationalization was a theme common to all the high-tech cases, with the rapid pace of change in the product markets involved[133] being a particular driver of the establishment and nurturing of close relationships with distant clients and partners.

Experiences of local partnerships

At start-up, all the high tech companies were restricted by the small domestic market and customers' limited purchasing power following the global economic crisis. Portugal had no ICT or biotech clusters by the nineties, or significant domestic markets for high-tech products. YDreams and Altitude for example, experienced particular difficulties in their experiences of partnership with knowledge centres, such as universities, due to divergent expectations in relation to goals such as return of investment (ROI) and a lack of effective institutional coordination in common projects. Also, Bioalvo had to first develop partnerships and gain reputation at an international level before it could access local partners.

The difficulties experienced in finding domestic partners and establishing effective relationships spurred efforts to seek such relationships at an international level and selectively target specific business niches and clients. The selected products developed in-house (e.g. basic integrative biotech ingredients) were nurtured in the light of close understanding of client needs and technology. Furthermore, the examined high-tech firms chose to go into partnership with large and wealthy companies to better access the needed capital, knowledge and clients.

The peripheral location of Portugal was experienced as a constraint in terms of developing relationships with international actors. Altitude, for example, complained about being distant from the principal telecommunication industry, located in northern Europe, which influenced its decision to acquire a Swedish venture. Although within a digital/networked economy, the importance of geographical proximity to partners and clients was emphasised by interviewees in these cases.

[133] E.g. in terms of the short life cycles of technology and products in the ICT sectors

Investment needs and accessing long-term venture capital

High-tech firms are generally very demanding in terms of long term 'patient' investment due to the R&D intensive nature of their products and the long lead times involved. Of the Portuguese cases examined here only NFive, a software developer, was self-funded. As they internationalized and competition intensified, all companies experienced difficulty in accessing funding suitable to the prolonged ROI of ICT and biotech activities. Domestic sources of venture capital are scarce, and the few venture capitalists that there are prefer to invest in traditional and less risky businesses, such as cork and wine.

Some domestic investors were inclined to support high-tech businesses but were unwilling to wait 20 years or more to recover their investment, as can be the case for biotech products, or to invest large amounts of initial capital in risky ICT products. Although European strategic reference framework funds (QREN) are aimed at supporting high-tech sectors, the application process was experienced as highly bureaucratic in its requirements and unconducive to business-opportunity time frames. The traditional bank loans were also unsympathetic and unable to respond to firms' long-term R&D planning and ROI expectations.

As a result, high tech companies were hampered by inadequate domestic funding sources and opportunities for shareholding. Most therefore opted to reduce what domestic shareholding they had and shift towards international funding sources. Biotecnol, for example, chose foreign shareholders that were able to provide appropriate amounts of long term capital and were better suited to the firm's strategic plan to enter new markets.

Financial constraints were also addressed by developing new services, licensing technology through international partnerships and reducing the costs associated with non-R&D personnel. The biotech companies, for example, provided services (e.g. consultancy, testing) in order to achieve additional revenues, while developing their own products in the meantime. ICT firms were able to outsource expensive sales and marketing efforts to local partners.

Experiences of public support

As previously noted, all of the cases had sought public support, principally European QREN funds, with only the biotech companies (notably Bioalvo) experiencing success in this respect. Indeed, only Bioalvo had benefited from public investment and QREN European funds since its inception, also experiencing success as part of an R&D project consortium targeting other less bureaucratic European financing (from the European Commission). Biotecnol, in contrast, although partly benefiting from public shareholding, rapidly turned to other international sources of investment that better matched its needs.

All of the cases also reported experiences of excessive and unsympathetic public bureaucracy, notably when applying for European funding programmes, institutional aid that principally targeted traditional sectors and regions (e.g. the cork and wine sectors), regulation that was constantly changing and perceived as unfair (e.g. taxation that did not allow exemptions for R&D investments) and public shareholders that were very focused in reducing costs, and unwilling to make long-term investments. The biotech firms in particular faced a legislative framework for regulating patents that was experienced as excessively bureaucratic (e.g. the pay out on patents being classified as costs, instead of investment).

There was also a lack of government support in relation to the process of internationalisation (e.g. from AICEP) – a key challenge for all of the cases. There was therefore a need to rely heavily on internal knowledge and capabilities, supplemented by external knowledge gathered through collaborative partnerships. Only NFive evidenced a total reliance on its owner-manager, disregarding the available public aid because of their perception of its ineffectiveness and requirements that were felt to be unreasonable (e.g. the stipulation to present their software at an international fair in the Portuguese language). These issues relating to the availability and effectiveness of public support further compelled the examined companies to look further afield for much needed resources and support.

Summary

The analysis supports the conclusions of other studies (e.g. Capaldo and Fontes, 2001) which have highlighted the weaknesses of the Portuguese context and the limited ability of its institutions to promote economic developments through supportive innovation policies, appropriate to breed growth-oriented ventures. More positively, there is also evidence of the importance of skilled R&D staff and knowledge transfer from academia. The firms did demonstrate entrepreneurial capability, irrespective of the lack of spatial economic concentration and the institutional and cultural characteristics seen as constituting an effective '*innovation milieu*'. Hence innovation and growth has been dependent on firms' abilities to learn how to transcend the limitations of their domestic context. The learning processes involved are further examined below.

6.3. Learning processes in high-tech firms – cross case analysis

Introduction

All the firms examined took the strategic decision to internationalize early on, in response to domestic constraints and in order to achieve proximity to crucial markets. They predominantly learned through interactions with external actors and sources of knowledge, with their owner-managers often playing a central role.

The owner-managers, because of their strategic importance in triggering new changes, were also pivotal on occasions when there was a need to address fresh challenges and opportunities. Planning was central in high-tech companies, irrespective of their size and age, given the biotech industry dependence on long-term investment and the ICT industry reliance on long-term partnerships.

A major early challenge for most of the high-tech cases was their lack of understanding of key international markets. They approached this problem in a sporadic fashion, often recruiting external expertise or consultancy firms. With regard to the generation of new products and processes through improvisation, there were only two cases of this, both ICT companies. Significantly, the Portuguese government was an early funder in the biotech companies (e.g. 28% in the Biotecnol start-up phase), given the shortage of private sources willing to finance projects with highly uncertain returns and to be realized over long time horizons.

Explorative learning was mostly led by owner-managers to gain business knowledge and to inform strategic changes at a wide inter-organisational scope. In addition, the skills of their R&D were improved on an ongoing basis through learning by doing rather than formal training initiatives.

In many of the cases the owner-managers played a leading role in directing the R&D process but with little involvement in other aspects of the business, except in smaller companies such as Biotecnol or NFive where owner-managers were more directly involved in other main functions as well as R&D. Although they were key knowledge absorbers, the companies' responses were also based on firms' R&D knowledge. In the ICT companies, the owner-managers and R&D teams were highly externally oriented. Conversely, in the biotech firms, the owner-managers appeared to be less externally-oriented and more internally focused. These companies absorbed external knowledge relevant to the application of their core capabilities, but without risking the R&D investment by revealing internal core capabilities to be licensed. Differing industry environments therefore tended to trigger different learning configurations in support of different entrepreneurial capabilities and degrees of 'openness' in terms of innovation.

High-tech firms – Learning processes

Table 6.2 shows the key learning processes of the high-tech companies, as identified from the interview evidence, and the scope or different scales of these processes – i.e. the learning scope. The rationale for the division between frequent and occasional learning modes is based on the observed frequency of such learning modes. These firms rarely combined vocational training (only evidenced in Bioalvo), acquisition of external expertise, the improvising of new products and processes, the imitation of competitors (only evidenced in YDreams), and the learning of new methods of learning with their recurrent learning processes. Learning processes that only occurred occasionally (in just two ICT companies - YDreams and NFive) were improvisation, acquisition of expertise, and learning new ways of learning by occasional strategic restructuring.

Table 6.2 High-tech firms – learning processes and their relative importance (frequent and occasional)

* Relative importance	Learning modes	Knowledge	Learning scope
Frequent	**'By doing';**	**R&D and Business**	**Internal team; management team**
	Networking;	**R&D (ICT), Business**	**Internal team; management team; partners; clients;**
	Searching;	**R&D, Business**	**Management team**
	Planning	**R&D, Business**	**Internal team; management team, partners (ICT)**
Occasional	'*Grafting*'	R&D, Business	Management team, partners, clients
	Improvisation	R&D, Business	Internal team; management team
	Learning to learn	R&D, Business	Internal team; management team
	Imitation	R&D, Business	Management team
	Training	R&D, Business	Internal team; management team

* Frequent (bold) and occasional learning processes – relative importance based on evidence from five high tech cases

Exploitative learning ('by doing') and exploratory and external interaction (by networking and searching) were particularly central to these companies; as also was planning activity in order to set business goals. On the other hand, exploratory activities in terms of the acquisition of external expertise ('grafting'), improvising new products and learning fresh ways to approach change, was more intermittent and usually prompted by unexpected challenges and the need for a new approach.

Most firms combined internal experiential learning, with modes of acquiring external and complementary knowledge (e.g. by networking). ICT companies exhibited, however, greater learning intensity than did the biotech companies, as reflected in partnerships to co-develop global products and consequent more intense inter-organizational learning and regular R&D networking. The biotech firms, on the other hand, tended to focus on the in-house development of specific products for client applications. YDreams, for example, spun out a related firm, Audience Entertainment, which emerged from an initial alliance with a US partner, following close inter-organizational planning and great 'openness' in terms of innovation procedures. Conversely, Biotecnol started up as a service provider and later focused on the development of its core patented microbial technology and only later (in 2005) engaged in collaborative R&D with other partners.

Learning 'by doing'

These companies learnt experientially, exploiting existing routine knowledge, both at the R&D and business knowledge levels (e.g. with the latter including regulatory and tax related issues). These firms were founded and owned by technologists that searched for related R&D knowledge, and were based around longstanding teams and patented knowledge. Their core capabilities were therefore R&D related in nature; whereas other organisational functions (e.g. marketing) were often outsourced (e.g. NFive and Altitude outsourced marketing and sales to local agents). Innovation activity in all of the high-tech cases was focused on developing applications of their core technology for highly specialised market niches. YDreams developed a strategic business unit (YLabs) that represented its innovation division, continuously creating new software (some never reached the market), based on the firm's core technology (augmented reality). Similarly, biotech companies made continuous improvements to match their basic technology to different client applications downstream.

Networking and partnerships

All high-tech companies were focused on developing products targeted at global markets and involving rapid technological change. ICT and biotech sectors both relied heavily on networking and firms' ability to develop partnerships with clients and other key global actors within sectors evolving towards increasing vertical integration, often

in the form of acquisitions and alliances. Networking at an international level was paramount for these firms to gain proximity to important markets and potential partners.

All companies had been engaged since their start-up in collaborative relationships, often on a long-term basis and involving trusted international partners, and which had been established as a result of their searching and networking activity. In a number of cases (e.g. YDreams, Altitude) project consortiums had involved close collaboration in R&D, often over a number of years, with conjoint planning of R&D and commercial functions. YDreams, for example, created a collaborative network for developing innovative products with the AR Consortium, resulting in various new partner companies being spun out in order to more fully exploit the resulting R&D outputs and the commercial opportunities involved (e.g. Audience Entertainment). The company participated in several long-term and highly demanding projects, involving a high level of inter-organizational planning and frequent meetings with a range of partners, mentors, and clients (e.g. including such high profile organisation as Dell and Microsoft).

Similarly, the biotech companies were particularly reliant on their ability to build links with resources that were relatively 'distant', including in geographic terms. Distant networking was carried out to address their main problems, and principally to attract international investment and to license their intellectual property. Biotecnol, for example, attracted US investment from JP Morgan, while Bioalvo collaborated with large pharmaceuticals groups and engaged in international university networks (e.g. UTEN) in order to help commercialize its products. All high-tech companies were engaged in high levels of networking activity and partnership working in order to access and take advantage of distant resources and to inform their strategic planning.

Searching

Searching for new clients, investment sources and partners became a constant among these firms with their increasing internationalization. The task of searching for new opportunities was almost entirely carried out by the owner-managers i.e. by personally approaching potential investors / partners, and recruiting new international staff with the international business expertise needed to complement their technological strengths. In addition, they had to deal with daily operational issues, either business, or R&D-related,

including applying for project investment and dealing with the direct effects of the economic crisis. NFive's owner-manager, for example, stated that he had to deal with a considerable number of operational issues (e.g. frequent change of tax regulation).

A common theme to emerge from the interviews was the need for owner-managers to be constantly aware and to proactively sense and select information on new developments and opportunities in order to keep abreast of a rapidly evolving context. In Altitude, for example, the owner-manager searched hundreds of potential clients and held regular meetings with clients and commercial partners. Bioalvo's owner-manager observed partners' best practices and met with clients to discover how to fulfil market demands. The importance attached to the need to absorb knowledge from external sources is also reflected in the frequency with which managers with international experience were recruited (e.g. in YDreams, Altitude and the biotech cases).

Planning

Formal planning of business goals was a crucial activity to these firms, in order to address the changing demands of growth and increasing internationalization. The complexities associated with spin-outs, attaining and supervising distant partnerships, and acquiring investment and external expertise, required the setting of detailed business goals in order to realise opportunities and synchronise resources over time. Formal planning was the norm in high-tech companies and was often informed by the inter-organizational learning and high levels of interaction with clients, consultants and (less often) universities. YDreams, for example, planned for the long-term following the advice of its larger partners (e.g. Dell) and consultants (e.g. Netscape, Lloyds, and Apple).

Formal planning was found to be a collective and inter-organizational process in high-tech companies, which depended strongly on R&D staff and on external shareholding. In this way, high tech firms nurture and integrate their entrepreneurial capability from different and complementary views, other than the top management team. In Altitude, for example, the process sought to include the views of staff at lower levels and was supported by a well-systematized knowledge management system. Likewise, the biotech companies attached great importance to careful planning, given that there was no room for error in accomplishing partners' requirements in terms of long-term ROI

and licensing of its core technology. Biotecnol for example, planned to anticipate the increasing needs of its market, establish the right financing schedule, and ensure strategic control.

Acquisition of new knowledge / expertise by recruitment ('grafting')

Most high-tech companies, being highly systematized and heavily reliant on international networking, drew upon external expertise in order to obtain closeness to international markets. Significantly, the biotech companies were less willing to commit resources to the acquisition of external 'grafted' knowledge, which may be a reflection of their being more financially constrained than the ICT firms and, as a relatively young Portuguese industry, a lack of consultants able to deal with the specialised products involved.

The acquisition of external expertise was combined with firms' searching and networking activities to realise opportunities and nurture the capabilities needed in order to be able to respond in time. In general, the high-tech firms tended to acquire external expertise after their previous approaches to searching and networking for relevant knowledge (e.g. marketing and sales capabilities) were found to be inadequate to keep up with the rapid pace of change in product markets. YDreams, for example, while networking worldwide, hired a Finnish manager from Nokia to address its lack of international marketing capacity and, at the same time, recruited US managers to work on its behalf (e.g. Nation Cinemedia). Such new acquisitions enabled the company to rapidly access business knowledge and proximity to important markets that were very demanding in terms of technical sophistication. Similarly, Altitude recruited a new manager, who restructured the company and successfully recruited local commercial staff that allowed greater responsiveness to better fulfilling clients' needs. However, such appointments often proved insufficient to manage international activities from a peripheral location and some companies therefore chose to establish headquarters abroad in order to achieve this.

Improvisation

The evidence suggests that high-tech companies, while assimilating external knowledge from different views and further planning and integrating it internally into a distinctive entrepreneurial capability, seldom created new products in real time, extemporaneously

(Moorman and Miner, 1998). The huge amounts of investment involved in new products and the accurate planning and highly demanding shareholders/clients left little room for improvising new products and processes at the R&D level. In the biotech sector, for example, exacting plans are followed in terms of investment and R&D testing and protocol.

Nevertheless, there were some occasional instances where owner-managers and R&D teams had rapidly improvised new product solutions through brainstorming sessions, in which acquired business knowledge and internal R&D capabilities were combined. YDreams for example, improvised new processes by collectively changing contracts already formed that were found unfeasible and had to be stopped, whereas NFive, improvised through 'brainstorming' sessions on interesting ideas about software's functionalities externally acquired by the owner-manager.

Learning new ways of learning

Changes of a strategic and structural nature can require transformative capabilities and new ways of learning. The concept of 'learning how to learn' captures the notion of a transformative process in which basic assumptions (e.g. what product to what markets) are reconstructed, often in response to a crisis (Argyris and Schon, 1978). The ICT companies, due to their regular structural and strategic changes, exhibited such explorative behaviour more often in pursuing novelty. Indeed, most of the ICT firms were found to have implemented major strategic changes and initiatives with some degree of frequency, resulting in the diversification of their businesses, restructuring the organisation (i.e. in terms of function/design and staff roles), developing collaborative products in partnership, acquiring other companies (e.g. Altitude) and creating spin-outs. NFive, for example, started up as a result of an international partnership, opened international offices, downsized businesses, developed new products, and franchised the business to others. The generation of novelty was often dependent on new ways of learning - e.g. how to share knowledge within international partnerships, interact with major distributors, or integrate existing technology into innovative products.

Conversely, the interviews with biotech owner-managers revealed less of a propensity to engage in radical change. When there was evidence of learning new ways of learning

this it appeared to have been triggered principally by their long term investment needs. Unlike the ICT cases, there were few examples of biotech firms diversifying, and creating spin-outs. Biotecnol, for instance, restructured its strategy only on one occasion (by changing its shareholding) and created only one spin-out (a Portuguese subsidiary), whereas YDreams span out five new companies. The distinct techno-economic life cycles involved (see section 6.2) and dependence on scarce long term investment sources ('patient capital') help to explain why biotech companies exhibit greater continuity and stability in their strategies and growth patterns, rarely engaging in more radical change involving new paths to opportunity realisation.

The accounts of the high-tech owner-managers indicate that they played a key role in promoting firms' entrepreneurial capabilities, i.e. by promoting knowledge exchange and learning both within their organizations and through interactions with external stakeholders, searching for opportunities and acquiring new knowledge and expertise. They also took actions following routine procedures, formally planning and improvising new products and processes, therefore bridging external and internal knowledge in order to shape opportunities and the various capabilities needed.

The owner-managers were highly engaged, at inter-organizational level, with partners, consultants, clients, as well as internal actors, thus establishing a key dimension of firms' entrepreneurial capabilities. Altitude's owner-manager, for example, brought international experience and related networking capacity to the firm. As a result, new clients were attained and new procedures in terms of knowledge management were introduced, contributing to the firm's high service level, reputation and ISO certifications. Biotecnol's owner-manager had particular competencies in addressing regulatory requirements and issues related to access to finance, including international sources.

Summary

The high-tech companies demonstrated high levels of variety and intensity in their learning processes, combining both *explorative behaviours* (i.e. learning by networking with stakeholders, searching for new clients/partners and formal planning of business goals) and also *exploitative behaviours* (i.e. learning 'by doing' focused on existing routines, technology and the efficiency of their core and longstanding R&D teams). The

knowledge-intensive and globalised nature of their products and related markets compelled them to engage in explorative high level learning leading towards the generation of novelty and to transcend their established organizational routines and '*theory in use'* (Argyris and Schon, 1978).

For most of these cases, internationalization has been an ongoing process since their start-up, including the nurturing of international partnerships, co-development of products in the long-term, and the frequent introduction of products/services with a short life cycle. In this way, they tend to regularly coordinate the daily exploitation of efficiency-related action, 'by doing', with intermittent exploratory action, involving external actors, and the acquisition of new business knowledge, thus demonstrating a wide innovation scope and entrepreneurial capability. These firms networked constantly to maintain closeness to important markets, searched for new opportunities and market trends, and planned inter-organizationally with partners, clients and shareholders in order to ensure an effective ROI. Planning activity was also important in terms of combining external business knowledge with internal R&D knowledge - a key entrepreneurial capability of these firms.

All of the high-tech cases were found to have made significant changes involving their organisational structures and/or strategy at least once in their lifetimes. However, the ICT companies were found to have most frequently engaged in new learning approaches and structural/organisational change, as particularly driven by the high rate of change and innovation in their product markets.

Forms of learning that were less evident included 'grafting' (i.e. the recruitment of new external expertise), improvising new products/processes, training staff and imitation of competitors. Imitation procedures, for instance, were hardly evidenced as both ICT and biotech products had proprietary rights. Also, there was little evidence of trial and error experimentation, which may be related to the high risk and investment-demanding nature of both ICT and biotech sectors.

6.4. Learning outcomes in high-tech firms – cross-case analysis

Introduction

The evidenced outcomes were principally related to the effective re-combination of core capabilities in ways that enabled growth through diversification of products and business streams (e.g. through combining different technologies), the achievement of a scientific reputation from universities and prestigious partnerships, and the increasing specialization, thereby improving efficiency. Also, the ability to secure new strategic investment sources constituted an important capability.

Different learning configurations led to different outcomes. Networking with (potential) clients and other external innovation actors led to new capabilities in nurturing and maintaining partnerships, and enabled firms to apply and integrate upstream R&D capabilities in diverse client sectors. Networking was also important in relation to international business communication and identifying new opportunities and knowledge resources. Simultaneously, increased experience in international partnerships contributed to the growing reputation of many of these cases, ensuing spin-outs, and customized approaches that, overall, constituted important competitive advantages.

Finally, incremental improvements, driven by efficiency considerations and learning by doing within R&D led to increased capabilities and specialization, with ensuing reputation and certification. The concept of learning new ways of better learning, particularly in dealing with strategic change related with the development of new products/services.

Learning outcomes

Table 6.3 shows the principal capabilities and competitive advantages resulting from the identified learning processes. As previously argued, different learning outcomes and capability sets emerge as a result of the interplay between firms' knowledge bases, entrepreneurial initiatives and organisational learning in response to varied contextual challenges and learning triggers.

Table 6.3 High-tech firms – principal learning outcomes

New capabilities	Competitive advantage
	New integrative platforms able to integrate distinct functions / technologies;
Integrative product / solutions;	Specialized spin outs / strategic diversity;;
Strategic flexibility;	Enhanced reputation and brand awareness;
Improved international networking and business knowledge;	Proximity to important US markets.
	Investment capacity;
Improved R&D processes;	Continuously improved R&D capacity, quality control and certification;
	Organisational improvement;

Integrative product / solutions

The examined companies were able, through inter-organizational learning (e.g. planning, searching, networking), to build integrative solutions by combining internal capabilities with complementary client technology and thus, to fulfil different needs. In the biotech companies, for instance, common bio ingredients were customised for diverse client applications whilst in the ICTs general platforms were adjusted to match different client technologies.

Strategic flexibility

External inter-organizational learning led to business diversification and varied spin-outs. In Biotecnol, for example, acquiring external expertise was crucial to regain strategic flexibility and to attain new international investment sources.

Improved international networking and business knowledge

Attaining the business knowledge needed to operate in international contexts was a major outcome and addition to the firms' knowledge base in many cases. Specifically, the activities of selling services (biotech), developing products in partnership (ICT), participating in industry seminars and conferences, and recruiting external expertise, added important international business knowledge that became crucial to mitigate the firms' peripheral context and improve access to investment sources. These companies

were able to enhance their reputation at an international level and increase brand awareness worldwide.

Improved R&D processes

These firms' R&D teams became specialized in distinct processes, with ensuing quality control and inherent certifications. The biotech companies for example, due to their experience in services provision (e.g. testing), attained increasing control whilst Altitude became ISO certified with regard to organisational processes such as its knowledge management system.

Summary

The outcomes identified in the high-tech cases were often of a structural nature involving significant strategic changes, as demonstrated through firms' acquisitions, spin-outs and locating headquarters near important foreign markets. These outcomes support that successful high-tech firms exhibit a high degree of integration between various capabilities that constitute their overall entrepreneurial capability.

6.5. Knowledge base, learning triggers and responses at traditional manufacturing firms – cross-case analysis

Introduction

The traditional manufacturing firms examined were from the Portuguese cork, moulds, footwear and wine industries, each of which faced different threats and opportunities. The analysis here seeks to distinguish the knowledge bases, different learning triggers and subsequent responses within this group of firms. Table 6.4 summarises the main findings.

As with the hi-tech cases, the traditional firms experienced a number of shortcomings in relation to their domestic and industrial contexts, notably inefficient bureaucracy with regard to accessing public support, a persistent credit shortage, and other regulatory barriers. All of the companies studied were able to internationalize and until recently were viable growth-oriented firms, succeeding, despite the limitations and barriers posed by their domestic contexts.

Other industry-related constraints experienced related to the domestic difficulty in engaging in partnerships and a related lack of trust between competitors. The traditional cases tended to prioritise investments in support of improving and expanding production, while also seeking public aid in support of their efforts to internationalise. These traditional firms were found to be strongly reliant on their in-house production capacities and on the prior industry experience and entrepreneurial learning of their owner-managers.

These firms tended to be production and marketing-oriented and managed at an intra-firm, intra-top management scale. The firms responded principally to competitive triggers rather than taking a more strategic perspective. The concern to keep the firm small and manageable and to maintain their core management team and operational staff were evident. Some were family owned (e.g. Pelcor and Moldene), which partly explains the continuity of their owner-managers within senior management teams. Other companies were embedded within their local sector clusters of moulds and footwear (Moldene and SOMarques respectively).

In general, the firms studied did not seek to acquire relevant international business knowledge which they clearly needed, preferring instead to rely on their existing knowledge and capabilities. They also tended to rely on the association between their products and Portugal's traditional image and location rather than moving abroad.

Initial knowledge base

In contrast to the high tech cases, the traditional firms were often late to internationalize. The firms' core knowledge base was largely built on the prior experience of their management teams in their domestic industries. Pelcor's owner-manager, for example, had in-depth industry and firm knowledge derived from previous experience of wine stoppers, while ACSMV's owner-manager also had a considerable entrepreneurial track record in the industry. Such previous business knowledge was paramount to tackling domestic barriers and entering new international markets e.g. in dealing with the application procedure for public funding (experienced by many businesses as difficult and excessively bureaucratic) in Pelcor and ACSMV, or in establishing important new partnerships with local distributors in culturally similar overseas markets.

Final knowledge base

Over the period of study, all of these companies exhibited changes in their initial knowledge base as they internationalized and restructured to target new businesses. Specifically, they improved their knowledge base in design (R&D) in response to international demand, and enhanced their international business knowledge as they attained more distant international clients and engaged in new partnerships. Indeed by 2013 Pelcor, for example, had gained a number of reputable fashion clients, recruited a well-known designer, merged to gain production capacity and intensified its presence overseas. Similarly, Moldene had improved its design capability in order to be more responsive to the needs of its automotive clients and had diversified into plastic moulding technology.

Learning triggers and responses

The evidence shows how firms' responses to challenges and constraints were strongly shaped by their prior experiences. With the exception of Pelcor, which had a significant presence in the domestic market (and has increasingly internationalized), most companies pursued internationalisation in order to survive and overcome the limitations of domestic markets and other constraints related to the economic crisis and/or the lack of a sufficiently supportive local context.

Table 6.4 Learning triggers and responses at traditional companies

Constraints experienced	Responses
Economic crisis; Small market size and competitive intensity; Difficult domestic partnerships; Difficulty in accessing funding, Lack of public support in terms of internationalization; Geographic peripheral location.	Internationalize to market niches; Domestic partnership only at non-core production level and international commercial partnerships with distributors; Self-funding and apply for European funding programmes; Rely on internal business and R&D resources; Invest on design functions, attractive payment conditions and small tailored product series; Augment marketing efforts and resort to public aid in internationalizing (only available in some sectors).

Limited domestic markets

Interviewees highlighted the small size of their domestic markets as a significant restriction on growth, being characterised by little purchasing power for quality/high standard products, intense price competition, and the increasing penetration of cheaper foreign goods (principally from the Far East). This was a key issue that compelled these firms to internationalize. Pelcor sought high standard markets that could afford its quality luxury product, whereas the other companies internationalised simply in order to survive. Moldene, for example, although part of an important Portuguese mould cluster, had only one domestic client and became increasingly internationalised during the period of this study. The same happened with SOMarques that exported most of its production to European markets, and ACSMV that was seeking new clients overseas at the time of the last interview (28 December 2011).

Public support and regulation

The lack of effective public support and experiences of excessive bureaucracy and inefficient regulation were also contributory factors in growth-oriented traditional companies' drive to internationalize. In SOMarques, the bureaucracy experienced in accessing QREN funds that required numerous authorizations, the excessive regulation regarding taxing (e.g. VAT) and frequent changes to the legal framework (i.e. in terms of labour issues) were described as posing serious difficulties for this business. Moreover, the lack of public support specifically designed for distinct sectors, compelled these firms to rely exclusively on their owner-managers' experience and efforts. Conversely, in two favoured sectors, the cork and wine cases, public aid proved to be decisive in the decision to internationalize, by exporting under the assistance of a trading institution (AICEP) and QREN funds.

Finance

Most companies relied principally on their self-funding capacity and, therefore, access to finance was not considered a critical issue. There has been a general credit shortage within Portugal, with some firms experiencing trouble in recovering payments from large customers and in maintaining their working capital level (e.g. as in the case of ACSMV). In response to this, firms have been relying more heavily on self-funding and/or the pursuit of international markets and more reliable customers in order to

achieve better payment conditions. Moreover, as late internationalizers, the traditional cases were constrained in terms of resource endowments which could be committed to much-needed investment in R&D and new productive capacity. Moldene and SOMarques, for example, experienced shortfalls in the production capacity needed to meet mass market demands early on and therefore chose to focus on customised products for small market niches.

Domestic partnerships

The traditional companies exhibited a general reluctance to engage in collaborative partnerships with other companies, which increased their difficulties in finding appropriate market partners, or accessing a suitable distribution channel abroad. They relied heavily on their in-house capabilities in terms of design, management and production capacity and only occasionally engaged in informal production and commercial partnerships in order to respond to peaks of increased demand.

The unwillingness to participate in collaborative partnerships appeared to be due to a combination of factors, including the lack of trust between firms, with their focus on maintaining their existing clients, protecting their core capabilities and competitive advantage. Pelcor's owner-manager, for example, expressed his concern about the risk of being imitated by competitors; Moldene were reluctant to risk divulging their particular core capabilities in terms of mould accuracy; SOMarques and ACSMV were concerned about losing clients to competitors. At the same time, the 'structural' drivers of collaborative R&D found in the high-tech cases – i.e. including rapidly evolving technology/ product markets, the more hybrid and 'open' nature of the firm cultures involved - were much less apparent in the traditional cases. Significantly, both Moldene and SOMarques, although part of the Portuguese clusters of moulds and footwear, only contracted production capacity intermittently, through sporadic projects.

Competitive intensity

Increased competition constituted a substantial impetus that forced these companies to improve their performance in terms of productivity, quality, costs, operations, and delivery time. The delocalization of industries to the East, in pursuit of cheaper labour, also triggered changes in the mould and shoe industries, which had previously been extremely reliant on low prices. For instance, the increasing domestic competition faced

by ACSMV compelled it to augment its productive capacity and marketing efforts, while the growing imitation of Pelcor's products forced it to differentiate in terms of quality and internationalize to niche markets.

The competitive issue worsened with the increasing economic crisis that further compelled firms to internationalize in order to gain larger markets and customers with greater purchasing power. SOMarques, for example, targeted large and wealthy distributors (e.g. in the UK), while Pelcor targeted fashion and luxury client sectors that were very limited within Portugal. The economic crisis also worsened the difficulties experienced in collecting payments as formally contracted with customers; hence internationalisation was motivated in part by the quest for more reliable customers and better payment conditions.

Peripheral location

The difficulty in promoting the companies abroad, due to their geographic location, was mentioned as another major barrier to international development. Moldene, for example, had few Portuguese partners and preferred to restrict its development of new technologies to in-house R&D activity. ACSMV exported principally to Portuguese-speaking countries because different cultures and languages in particular were experienced as significant constraints on their ability to internationalize.

Summary

These companies operated within industries characterised by little public support, a tendency to be self-reliant in terms of finance, and a heavy reliance on the experience of owner-managers. The existence of a common environment (e.g. institutional, legal and competitive) affecting many aspects of firms' learning behaviour, reinforced a tendency for firms to adopt similar approaches and products. They may try to change continuously, but, the aggregate effect of firm's individual change is to reduce the extent of diversity among them through a process of homogenization or *isomorphism.* Thus a particular firm is pushed to resemble others that face the same set of environmental constraints, in which imitation of competition plays a role. In fact, the uncertainty about international markets and ambiguous business goals in the absence of long term planning encouraged most of these owner-managers (e.g. Pelcor, SOMarques, ACSMV) to seek models from other successful competitors, increasing firms'

homogeneity. Pelcor and SOMarques, for example, emphasized the need to build on fashionable models whilst ACSMV underlined the great homogeneity between wines from competitors, in which only marketing efforts made a difference. These isomorphic pressures and the nature of product markets reduce likelihood of firms engaging in radical innovation. In this way, they responded to competitive triggers principally through incremental and tactical market moves rather than by abrupt strategic shifts. Design and occasional production enhancement through partnership were considered key to differentiate products and target different market needs, and particularly so given firms' limited resources.

Peripheral location and domestic markets that were saturated and highly competitive were therefore crucial learning triggers that compelled firms to target distinct international markets. High service levels in terms of design accuracy, payment conditions and on-time delivery was paramount to meeting the demands of the targeted European markets.

6.6. Learning processes in traditional manufacturing firms – cross case analysis

Introduction

All four of the traditional manufacturing cases were characterised by their close client relations – a factor identified in previous studies as associated with SME growth. The approach to clients was found to be particularly dependent on the experience of owner-managers', with this being centred in the top management team.

Learning processes in these firms were shown to be mostly focused on incremental improvements to their existing products and processes. The owner-managers also mentioned that imitation of their competitors was an important activity in order to benchmark fashion trends and adapt firms' products. Formal partnerships were found to be rare and these companies therefore exhibited little evidence of learning by interacting with external actors.

The formal planning of business strategic goals was also rare in these cases, with experiential and reactive approaches tending to dominate, and with short-term goals being set at top management level, with few inputs from other corporate functions, apart

from design. The corporate goals were mostly focused on objectives related to production, marketing, and incremental product development, rather than involving significant organisational/structural change. These findings are consistent with previous literature on high-growth firms which posits that such firms grow organically (BERR, 2008).

The learning processes of the traditional cases therefore needs to be understood in relation to the dominant role of their founding owner-managers, their relatively hierarchical and reactive organisational cultures and their mature and less knowledge intensive (compared to the high-tech cases) products. The owner-managers' experience, at the domestic level, was reported by the interviewees to be a core capability, with little need for external expertise. Vocational training occurred only in some companies and in response to the availability of public funds (i.e. QREN). In general, these companies, operating in relatively stable sectors and focused on short-term efficiency, were rarely compelled to instigate significant change, for instance in terms of strategic repositioning.

Traditional firms – Learning processes

This section seeks to explain traditional firms' learning processes in terms of their scope and the different types of knowledge involved. Table 6.5 summarises the learning modes, type of knowledge and scope, dividing these into frequent and occasional categories of relative importance for this subset of firms, as derived from the case study evidence.

Table 6.5 Traditional companies - learning processes and their relative importance (frequent and occasional)

* Relative importance	Learning modes	Knowledge	Learning scope
Frequent	**'By doing'**	**R&D (production / design), Business**	**Internal team, management team;**
	Trial and error	**R&D, Business**	**Internal team, management team;**
	Searching	**Business**	**Management team.**
Occasional	Networking;	R&D (production / design) , Business	Management team, partners, distributors, clients;
	Imitation;	R&D (design), Business	Management team;
	Improvisation	R&D, Business	Internal team, management team;
	Training	R&D	Internal Team.

* Frequent (bold) and occasional learning processes – relative importance based on evidence from four traditional cases

Learning by doing

These companies exhibited successive continuous production and design improvements in order to better fulfil client demands. Learning processes tended to be limited to the core management team, with little evidence of wider organisational learning or creative input from the production workforce. They tended not to seek external technical advice and preferred to rely on their internal teams, principally at the design level. Both SOMarques and ACSMV' owner-managers felt that the available consultancy services were too expensive and difficult to afford. Moreover, SOMarques's owner-manager claimed that such consultancy services were of little value as they relied on generic sectoral knowledge. Such views, although underlining the strong reliance upon internal knowledge and relatively 'closed' innovation scope, also suggests the potential isomorphic influence of consultancy services that produce similar reports for different businesses based on generic knowledge.

Product and process developments therefore tended to involve ongoing incremental change and the exploitation of existing opportunities, with product development being heavily reliant on the experience of longstanding teams. There was little in the way of planned formal learning, such as vocational training, and where there had been such initiatives these were largely driven by the availability of publicly funded support (e.g. Moldene).

Trial and error

Business development in three of the four traditional companies (i.e. excepting Moldene, a more knowledge intensive company) was found to occur in a relatively unsystematic fashion, often in reaction to successive issues relating to competition and other challenges. Being largely self-financing further reinforced the tendency for major issues to be addressed with little external input. Relatedly, there was little recourse to strategic planning and a preference on the part of owner-managers to learn by attempting new business opportunities, relying on their previous experience (e.g. in prospecting for new clients). Sometimes they succeeded, while on other occasions such unplanned business management went wrong. SOMarques, for instance, was faced with an unanticipated downturn in sales due to a sudden change in the economic climate, whereas Pelcor only discovered new cork skin applications accidentally and has experienced frequent failures in its attempts to develop new composite products. ACSMV appeared to have based many of its business decisions upon intuitive judgments which sometimes resulted in success in gaining new clients in culturally near markets, while on other occasions it was unable to address markets with very different business practices and cultural traditions, such as China.

Searching

The traditional companies tended to acquire external business knowledge through search activities that were primarily undertaken by owner-managers, were targeted at geographically nearby markets, and involving a decision process that was both less professionalized and more top-down compared to the high-tech cases. Clients' needs and preferences were identified through trust-based personal contacts, while offering high level services and R&D/design capabilities. SOMarques's and Pelcor's owner-managers, for example, visited clients personally and apprehended fashion trends at trade fairs, whereas ACSMV's travelled overseas to learn about its distributors' needs.

The constant sensing and selection of opportunities also enabled the achievement and maintenance of trust-based relationships, notably in the case of Moldene.

Networking

These companies needed to network at the business level to achieve stable partnerships and enhance their business specialization in a context of peripherality and the related difficulty of communicating abroad. However, such networking tended to be intermittent and resulted in only a few instances of partnerships that were restricted to the business level. They only engaged in networking with respect to product distribution and marketing, and also to develop occasional projects conjointly with clients and to increase production capacity in response to peaks of demand. For instance, Pelcor's networking activity was focused on marketing, with product development remaining an internal process, although it did merge with another business in order to achieve additional production capacity. Likewise, product development at SOMarques and ACSMV was also an entirely in-house activity as was production, except when occasional demand peaks were experienced, with informal production partnerships being established to meet these. These companies therefore exhibited relatively closed and internalised decision-making process, rarely engaging in joint product development with other organisations and only engaging in occasional partnerships. Moldene, the most knowledge intensive of the traditional cases, was the exception, being constantly engaged in networking to ensure the exact required product and to be able to respond to clients' needs.

Imitation

Although some companies emphasised the uniqueness of their products, they also engaged in imitation of the products of their competitors on occasion. Such imitation usually involved slight product changes to better meet market needs and trends - e.g. a tailored shoe, or a specific wine label design. For example, SOMarques's owner-manager, conjointly with the company′s designer, adapted the leading fashion trends that he observed in Milan or Paris, to create a distinct product. Pelcor's owner-manager benchmarked fashion trends to inform the development of its exclusive cork accessories. These procedures were not identified in the case of Moldene because the company provided an inimitable mould, aiming to accomplish a very precise client demand, involving a knowledge-intensive process.

Improvisation

The external knowledge collected by the owner-manager tended to be further incorporated into organisational R&D and productive knowledge through rapidly improvising new products and processes. SOMarques, for instance, in order to respond to an emerging trend identified at trade fairs by the owner-manager, rapidly improvised a new shoe model conjointly with the design team which incorporated the new features into their traditional shoe. Pelcor's designer, at the owner-manager's suggestion, improvised cork products from accessories from other sectors (e.g. footwear). Design teams were therefore central in the process of improvising new products, whereby business knowledge was combined with technical expertise in order to succeed in highly demanding markets (e.g. fashion). Conversely, Moldene did not engage in such improvisation, largely because its products and processes were highly knowledge intensive, involving longer lead times and clients' exacting technical requirements.

Learning new ways of learning

The traditional cases rarely engaged in strategic restructuring unless their existence was at risk in facing a critical event – a highly infrequent occurrence. For instance, Moldene's investment in a new plastic moulding technology compelled it to reorganise and transform its business whilst Pelcor merged to acquire extra production capacity which also required changes to its organizational structure. ACSMV, an old company, was compelled to internationalize and more recently to acquire additional production capacity and improve the qualifications of their team. Structural changes occurred rarely because manufacturing companies operated in relatively stable environments, relying principally on efficiency-related learning processes.

Planning

There was little evidence of formal planning of business goals, with planning in most of the cases tending to be short-term and addressing operational issues (e.g. production programing). These companies followed a functional structure, in which decision-making was largely confined to the top management team and implemented in a top down fashion. There was little evidence of attempts to promote organizational learning

by informing or seeking input from the workforce in relation to the decision-making process. SOMarques's owner-managers for instance, programmed the operations within a monthly budget, or within a three month time span, whereas ACSMV's planned their operations annually in order to ensure production capacity and maintain long-term clients. Moldene prioritised the detailed planning of its mould parts at the production level, in order to fulfil the demands of its existing clients. The dominant management approach of these companies was therefore highly marketing-centred and reactive.

The owner-manager

The owner-managers of the traditional cases were found to play a key role in terms of setting goals and embedding new routines. All of these companies were small (i.e. ranging from 5 to 55 employees) and with their learning processes tending to be confined to the top management teams and, as previously noted, with little involvement of employees in decision making. The owner-manager tended to be the favoured link between the business knowledge searched and networked and the firms' internal knowledge. In this way, the *entrepreneurial learning* of owner-managers was at the centre of the learning processes that constituted firms′ entrepreneurial capabilities, although the extent of wider *organizational learning* was much more limited than in the high-tech cases. Specifically, owner-managers appeared to be highly participative in relation to their design teams (e.g. in creating a new cork accessory, a mould part, or a shoe) but played a more individual/hierarchical role when setting business objectives with input from other managers, and little external input (e.g. there was no shareholding). Although there was some evidence of collective learning, for instance when improvising a new product, there was little evidence of more significant and transformative organisational change in response to critical learning events.

Summary

The analysis of the traditional cases shows relatively consistent pattern in terms of the learning processes involved and the distinctive interplay of internal and external influences. The external triggers identified largely related to the increasingly competitive nature of their markets, which led to reactive and incremental behaviour, notably through incrementally adjusting routine procedures and product design, often following the business intuition of owner-managers. On the other hand, inter-organizational interactions were crucial to gaining external business knowledge (e.g. competitive and institutional information), principally through searching (sensing and selecting) new opportunities. Newly acquired knowledge (e.g. on fashion trends) was occasionally merged with firms' internal knowledge resulting in a capability based on rapidly improvised new products (e.g. a new wine or shoe).

Finally, networking activity was limited except with respect to the need to keep abreast of market and fashion trends, with some sporadic imitation of competitors (e.g. a new shoe design) and little formality or inclusivity with respect to planning strategic goals. The owner-managers were found to be the key actors in terms of absorbing and combining business and technical knowledge to build the firm's entrepreneurial capabilities.

6.7. Learning outcomes in traditional manufacturing firms – cross case analysis

Introduction

Traditional companies exhibited much less evidence of outcomes involving significant strategic change compared to the high-tech firms, which can be related to their heavy reliance on the experience of owner-managers and focus on firms' in-house productive/design capabilities. Most (three out of four) of the traditional cases were family owned, with decision making being highly centred on the senior management team and favouring efficiency-driven learning, resulting in incremental product changes.

Despite the relatively narrow scope of their learning, during the course of this study these companies were found to have accumulated important new business knowledge and capabilities needed to deal with the international business environment.

Internal efficiency-related learning enabled continuous product and processes improvement while maintaining their established client base, which brought competitive advantages. These companies also demonstrated an ability to rapidly improvise new products.

Learning outcomes

Table 6.6 shows the capabilities and competitive advantages derived from the learning processes identified.

Table 6.6 Traditional firms - Principal learning outcomes

New capabilities	Competitive advantage
Business capabilities in international marketing / networking; New production and R&D capabilities; Flexible core productive and design capabilities; Flexible decision process;	Small, flexible and manageable structure; Diverse and specialized business niches (cork, moulds); Increased reputation; Service level, close market approach and tailored products; Certification, reputation and client loyalty; Increased production capacity and control;

Business capabilities in international marketing and networking

These companies were initially domestic-oriented and since having internationalized following their owner-managers' searching efforts, have continued to prioritise flexible organisational structures, prioritising their design expertise, in order to facilitate their ability to respond quickly to different market demands and trends (e.g. Pelcor, Moldene). By learning interactively, the companies entered into the more demanding international markets. Pelcor's strong reputation was attained through its marketing efforts, including participation at prestigious trade fairs and art museums. Moldene was internationally known for its mould precision and responsiveness to different clients in the highly demanding automotive sector.

Production and R&D capabilities

These firms developed proximity to the markets and built new design capabilities and customized products on the basis their close understanding of evolving clients' needs. Efficiency-related learning allowed for continuous improvement and quality control, leading to certification and enhanced production capacities. Pelcor, for example, achieved mastery of the production of cork-based accessories and merged with another business to further extend its control of the entire quality process. Moldene internalized the process of plastic moulding technology in order to control its quality process, whereas SOMarques and ACSMV supervised the entire quality process, entering into occasional partnerships only when there was a need to augment their productive capacity.

Flexible productive and design capabilities

Newly achieved capabilities, i.e. in terms of production, customised product designs, and complementary technologies, made possible flexible responses to variable demand from diverse markets, thus constituting a key competitive advantage. Moldene, for example, although a specialist in the automotive sector, had skills to supply the aeronautic and domestic client sectors. Pelcor supplied diverse client sectors with varying quality requirements, whereas SOMarques was able to address both mid- and high-range footwear sectors. These companies generally lacked the production capacity needed to operate on a large scale and at an international level, targeting instead specialized niche markets.

Flexible decision-making process

These firms evidenced greater informality in their approach to management compared to the high-tech cases which placed greater reliance on professionalised functions and knowledge management systems. The traditional owner-managers met informally and frequently shared the gathered knowledge and set goals. In SOMarques, for instance, frequent management team meetings were often spontaneously convened to respond to emergent needs, opportunities and challenges. Pelcor's decision-making process was more centred on its single owner-manager, supported by a small team. Only Moldene demonstrated a more formal organizational structure comprising a number of teams focused on different cultural/linguistic markets. Informality allowed for faster and more

flexible responses to client needs in sectors such as moulds or footwear, where business conditions in terms of fast response and payment make a significant difference.

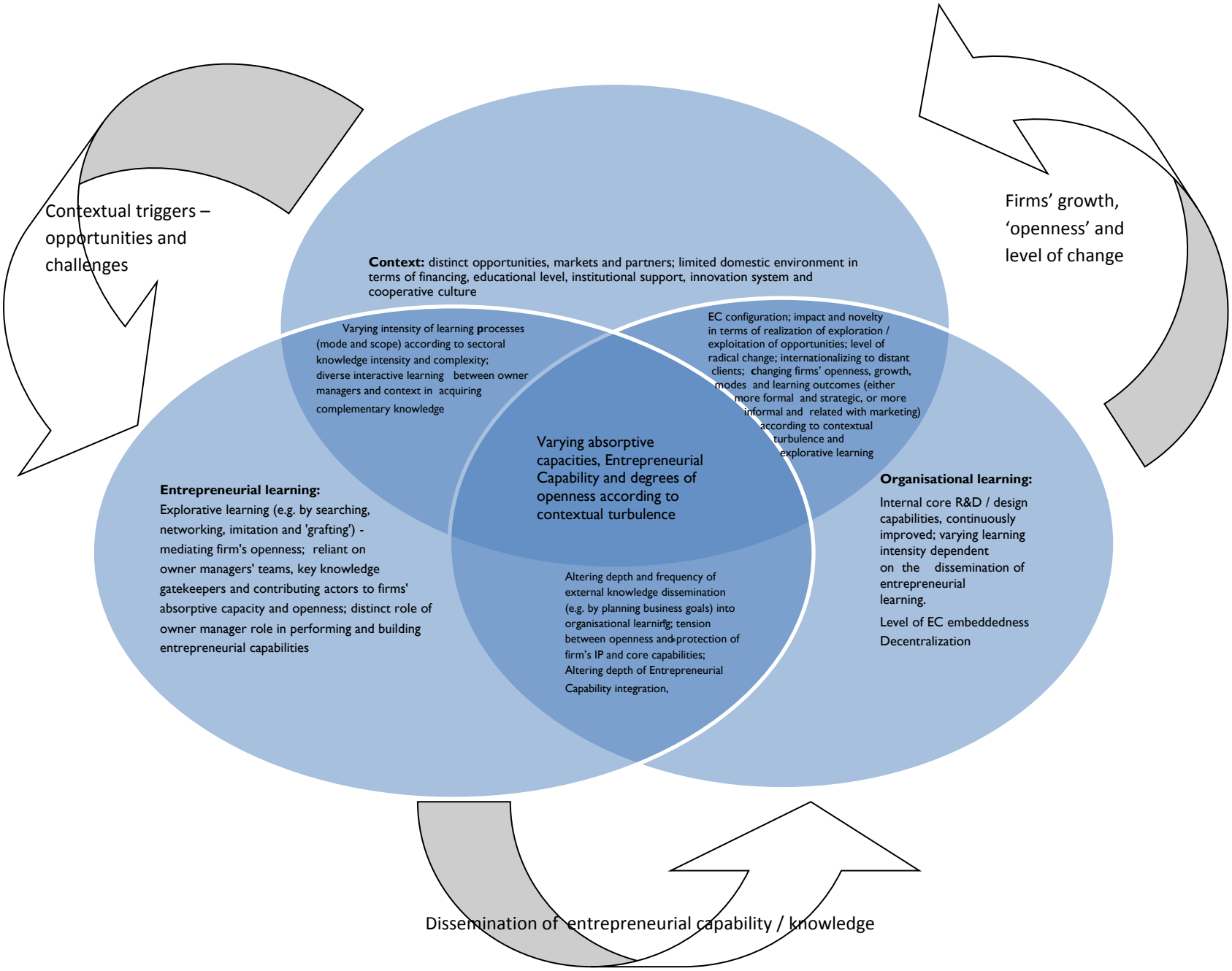
Summary

Learning and capability development in traditional companies has been focused on the achievement of competitive advantages principally in terms of international marketing and enhanced product design. They were compelled to internationalise and also had to improve their efficiency and production capacity, either making additional investments or occasionally resorting to partnerships. The nature of their mature markets has particularly reinforced a tendency towards reactive, efficiency-driven behaviour and gradualistic outcomes. In this way, they were able to attain new capabilities in international marketing and networking, although exporting principally to near markets. On their way, they improved their design skills to better fulfil these client needs, become certified, reputable, augmented their product portfolio and reinforced their flexible and informal decision-making process.

6.8. Discussion

This section discusses the learning processes across the two sets of firms, highlighting the patterns and variations between them in order to deepen the analysis. This discussion relies upon the organisational learning framework; the learning issues faced and corresponding responses; and the learning outcomes. The study contributes to previous understanding and theory relating to growth-oriented SMEs and their contexts (e.g. Katz and Green, 2008) by examining in-depth the characteristics, learning behaviours, adaptations and outcomes of a sample of GOFs within Portugal. Figure 6.1 presents a model of the learning process in in growth-oriented SMEs in peripheral/intermediate contexts.

Figure 6.1 The learning process and 'openness' in terms innovation of growth-oriented SMEs in peripheral/intermediate contexts



Previous research identifies the firm's knowledge base as a key resource in driving growth, with the R&D function in particular both creating new knowledge in-house and augmenting the absorption and exploitation of external knowledge (Cohen and Levinthal, 1991).Yet, many studies consider the firms' growth process as a '*black box'* (McKelvie and Wiklund, 2010) and there is still a need to understand the idiosyncratic processes by which firms apply new knowledge to achieve their goals in different contexts (Sadler-Smith et al., 2001). This research identifies the knowledge bases, learning processes and types of knowledge underlying firm growth processes in different sector contexts in Portugal. The success of Portuguese high-tech firms is shown to be particularly dependent on their R&D capabilities in relation to their knowledge-intensive niche products and the international nature of their product markets, whereas traditional companies exhibit a stronger domestic industry orientation (Table 6.7). Furthermore, high-tech companies were generally founded by and reliant on highly qualified individuals with strong academic backgrounds gained at Portuguese universities. On the other hand, owner-managers of traditional manufacturers tended to be less qualified and more reliant on their prior business experience at the domestic level.

Because of such different histories, the owner-managers of traditional companies had different entrepreneurial knowledge and tended to be more focused on operational issues than with strategy. Thus, in the absence of high R&D capabilities, their entrepreneurial experience appeared to play a significant role in terms of limiting the growth potential of these firms. Moreover, all of the firms experienced significant gaps in their business knowledge, constituting a major learning constraint. Evidence was found in support of the importance of R&D in inducing new knowledge (Cohen and Levinthal, 1991), and of how firms' knowledge bases have changed over time, often in response to increasing internationalisation, with high-tech firms evolving towards more complex and 'open' R&D approaches whilst manufacturing firms have particularly enhanced their international business knowledge (Table 6.7).

This study has identified the importance and processes of 'open innovation' (Chesbrough, 2003) in different sectors in a peripheral context. It is important to note, however, that innovation processes are generally less open than is suggested by the 'open innovation' concept, given firms' need to conceal and protect their knowledge

from competitors as well as absorbing external knowledge (e.g. Oakey, 2013). All of the companies examined here sought and applied external knowledge that contributed to increasing their absorptive capacities, although exhibiting different inter-organisational learning scopes and degrees of 'openness' in terms of innovation. The cumulative acquisition of international knowledge by high tech companies, for instance through networking or 'grafting' external expertise, augmented their openness in terms of innovation by extending the scope of their inter-organisational learning, and sometimes boundaries, through spin-outs (YDreams, Biotecnol), important partnerships (Bioalvo, Altitude) and new investment sources (Biotecnol).

In the traditional companies, new international knowledge, attained principally from clients and distributors and within a narrower learning scope, contributed to new design capabilities and enhanced understanding of their markets[134] (Table 6.7). Additionally, this study evidenced the motivation and actions by which firms sought to protect their core capabilities - R&D in high tech and design in the case of manufacturers. All companies were very zealous with regard to their core teams and struggled to retain their key staff, particularly at the R&D and design level, due to Portugal's peripheral location and remoteness from the key industry actors, as well as the difficulty of recruiting a workforce domestically.

[134] E.g. Pelcor hired an Art Director to address the increasingly important design issues, aiming at also increasingly more demanding international clients.

Table 6.7 Cross-case knowledge base, learning triggers and firms' responses

Firms' responses		Learning triggers			
		Internal		External	
High Tech companies	**Traditional companies**	**High Tech**	**Traditional**	**High Tech**	**Traditional**
R&D oriented responses; Internationalize since start-up by partnerships; *'graft'* external knowledge; development of knowledge management systems; Plan at wide scope; Diversify to key international markets / clients;	Industry and design oriented; Internationalize incrementally by exporting; heavy reliance on had hoc / informal learning; Planning at short range, 'top down', at teams' level; Expand products to geographically and culturally near markets;	Lack of international business knowledge (INF);	Lack of international business knowledge (INF);	Domestic regulation (L); Excessive rules and regulations (L); Poor knowledge transfer between firms and universities (L); Small market size (I);	Global competition (I); Poor domestic payment conditions (L); High transportation costs (L); Cultural differences overseas (L); Small market size (I);
Resort to international investment sources; Services selling; Licensing; Franchising;	Reliance on self-funding; Seize institutional support (shoes and cork industries);	Lack of financing capacity in the long-term (S);	Financial balancing (O);	Trouble in getting long-term financing (S); High interest rates (L); Credit shortage (L);	Lack of public support (I); High interest rates (L); Preference for some industries (I); Credit shortage (L);
Move headquarters abroad, Spin out; Externalize non-core R&D capabilities; develop consulting functions; Integrate accumulated R&D capabilities into integrative approaches;	Improve the design function; production and marketing changes; Improve operations and delivery time; Outsource capacity (shoes); Merge (cork); Internalize outsourced functions (moulds); Obtain reliable foreign representation (wine); Capitalize the Portuguese image;	Need to innovate continuously to face competition (S);	Lack of formal knowledge workflow (INF); Difficulties in contacting customers (INF); Lack of capacity to export (O); Lack of technology (S);	Trouble in promoting the firm abroad (L); Lack of public support (I); Lack of regional network (L); Poor domestic Infrastructures (L);	Difficulty in engaging in collaborative partnerships (L); Distant from markets (Shoes) (L) Lack of regional network (Moulds) (L); Complexity of international markets (L);
Network internationally to attain a high standard diverse portfolio; Keep firm small with the same R&D team; Strategic repositioning;	Target customized market niches; Maintain traditional clients; Keep the firm small and with the same top management team; Cost control;	Owner-managers' proactive posture (S);	Owner-managers' reactive posture (S);	R&D labour availability (L); Deteriorating economic environment (L);	Production labour availability (L) Deteriorating economic environment (I)

Learning triggers: INF – Informational; S – Strategic; O – Operational; I – Industry specific; L – Location specific

Domestic constraints

Previous research has emphasised the importance of context, i.e. in terms of business networking and milieu (Etienne et al., 2008) and the need for learning processes to be understood in terms of contextual factors as well as firms' internal characteristics (Macpherson and Holt, 2007). This study showed the main constraints and corresponding responses experienced by firms in the context of Portugal. It supports the view suggested by some recent research that the current economic crisis, lack of finance, qualified labour, and poor access to information and advice continue to hinder Portuguese firms' innovation and growth processes (e.g. Santos, 2000). This study shows in particular how both high-tech and traditional firms have been able to internationalize to overcome domestic constraints and to develop new markets in order to survive and grow (Table 6.7). In this respect, domestic clients represented only a residual share of the case study companies business[135].

Different sectors, however, pose different challenges. High tech companies overcame the domestic constraints faced through their strong collaboration with international partnerships whilst traditional companies were able to establish occasional production partnerships in response to sporadic increased demand. In addition, traditional companies were generally reliant on their ability to self-finance and therefore, did not face the investment needs of high-tech industries, nor were they forced to sell services to survive.

In general, the evidence indicates that high-tech companies experienced less difficulty in dealing with the international environment than did traditional manufacturers. They were more reliant on international networking (and shareholding), while their owner-managers were more educated. They therefore exhibited greater flexibility and strategic responsiveness than did the traditional companies which responded to challenges and new market knowledge in a more incremental fashion.

Peripheral location

Previous research has tended to focus on contexts that are well-favoured in terms of the sort of infrastructure and support needed to facilitate high growth businesses (e.g. Boekema and Rutten, 2007). Few studies have explored firms' learning within

[135] Only Pelcor held a significant domestic market share of 30% in 2012.

peripheral contexts (e.g. Fontes, 2007), with their varied differences in terms of regulation, taxation, and access to finance (Bartelsman et al., 2005). Other research on Portuguese businesses confirms a context of poor productivity and weaknesses in the education of human capital and in innovation capability (Teixeira and Fortuna, 2004); a relatively closed approach to innovation (Lopes and Teixeira, 2009), and weak networking competencies (Teixeira et al., 2013). Furthermore, the research corroborates the weak linkages between Portuguese SMEs and local universities, attributed to cultural differences and a lack of entrepreneurially-minded staff within universities (Varum and Rocha, 2013).

This research provides further evidence of the nature of the domestic constraints experienced by Portuguese firms, notably, limited engagement with international networks and markets, a lack of international business knowledge, lack of effective location-based resources (such as public support with regard to internationalizing), lack of appropriate bank or venture capital finance, poor infrastructure and facilities to support innovation (e.g. science parks) and lack of effective and collaborative partnerships with universities and other firms. Traditional companies experienced more intensely the effect of such a limited regional system of innovation due to their owner-managers' lack of international knowledge, narrow experience base, and lack of purposive regional networks.

Nonetheless, domestic institutional support in terms of internationalizing was effective and important in two of the traditional cases at least (Pelcor and ACSMV). These findings are congruent with other recent research confirming that financial assistance is concentrated on certain favoured sectors (e.g. cork, wine) (Pinho and Martins, 2010), and also that internal equity was the primary funding source for most companies (Bartholdy et al., 2012; Serrasqueiro et al., 2011).

The study evidenced that all companies faced financial, knowledge and location-related constraints due to their peripheral location and lack of effective regional innovation strategy. It supports recent research in a Portuguese context of overly-centralised decision-making that has hampered local initiatives in terms of investment (Cabral, 2007). Specifically, it corroborates recent studies on the largely incipient nature of the Portuguese venture capital market (Teixeira and Grande, 2013). The biotech firms in particular, were negatively affected by the lack of public funding and shortage of long

term investment, pushing them to dependence on their service provision to larger partners. High-tech companies faced constraints in terms of lack of collaboration opportunities at the domestic level. There was no evidence of ICT and biotech clusters at the domestic level, which, together with the small market size and inadequate infrastructures forced the companies to turn towards international markets, including by moving plants abroad (e.g. Biotecnol). The sporadic recruitment of external expertise also played a role in firms' efforts to transcend their peripheral context, expanding their inter-organisational learning scope and contributing to their adoption of 'open innovation' practices.

The high-tech companies were shown to have largely addressed the major informational and funding requirements needed to develop their complex products (e.g. combined technologies) and attain closeness to key distant markets. These companies, in general, were able to diversify to different Business-to-Business (B2B) sectors, through conjoint product development and numerous inter-organisational interactions (e.g. licensing).

Traditional manufacturing companies, in contrast, experienced greater difficulty in dealing with their context and engaging with an international business environment. They were more heavily impacted by the effects of the economic crisis being principally Business-to-Client (B2C) sectors, in which customers tended to disregard secondary goods (e.g. accessories, shoes and wine) in the middle of a financial shortfall. Furthermore, they approached internationalization incrementally while seeking to maintain their domestic market share, and competing through customised rather than low price products. Additionally, although some companies were part of some local clusters (e.g. moulds), due to the less collaborative environment, they hardly engaged in domestic partnerships, other than informal and sporadic production partnerships.

The Portuguese context and 'innovation system' was therefore shown to pose a number of challenges and limitations for GOFs that strongly influenced their learning processes and ensuing growth trajectories.

Firms' responses

Prior research posited that the growth and success of firms depends on how they deal with events and crises (Nicholls-Nixon, 2005). This study contributes with insights into the different forms of 'openness' in terms of innovation practices and how this group of

GOFs responded to contextual challenges. Traditional firms were found to rely principally on their relatively less formal approaches to R&D, and related design capabilities, their productive efficiency and the considerable entrepreneurial experience and business networking activities of their owner-managers. These companies were found to be production and marketing-oriented and rarely sought advice or decision making support outside of the firms' boundaries, whereas high-tech firms were much more network-oriented on a worldwide scale. Moreover, traditional manufacturers, due to their inward-looking tendencies and lesser degree of openness in terms of innovation, chose to contract additional capacity intermittently. High-tech firms, on the other hand, engaged in formal production and licensing partnerships with large international companies.

Previous research, conducted in favoured regions, suggests that high-tech companies tend to grow by spinning out or acquiring other firms, evolving towards localized industry agglomerations (Schreyer, 2000). This study has revealed that the Portuguese context falls considerably short of the ideal national innovation system suggested as being necessary to support GOFs (e.g. Delmar et al., 2003). Portuguese SMEs, although experiencing sales growth, neither experienced much growth in terms of employment over time (as reflected in Portugal's below average share of employment in science and technology within the EU - see section 3.4), nor were they part of localised clusters (Teixeira and Grande, 2013). The lack of localised networking, economic cooperation, or effectively governed support compelled Portuguese GOFs to rely heavily upon the development of their internal core capabilities, while widening their learning scope and openness to relatively distant sources of knowledge and resources. This occurred through diverse interactive learning processes (e.g. networking, searching) that varied according to the nature of the sectors and product markets involved (see Figure 6.1).

Learning processes

Previous research contended that there is a need to explore how firms' learning enables SMEs to respond differently to varied external constraints, whilst maintaining their growth (Smallbone et al., 1995; Zahra et al., 2006; Theyel, 2012). This research identifies the different learning configurations of two groups of high-tech and manufacturing companies.

The analysis has revealed the various processes by which Portuguese high-tech and traditional companies have been able to access and apply new knowledge when responding to opportunities and challenges (Table 6.8). The high-tech companies revealed greater 'openness' in terms of innovation practices and higher learning intensities, as evidenced by their larger range of learning modes (e.g. YDreams). Learning interactively through procedures of searching new external opportunities, imitating the competitors and networking with distant partners, suppliers and clients were shown to be key to the acquisition of complementary external knowledge (e.g. in sensing and selecting business opportunities). Also important was a relatively inclusive approach to integrating the views of staff at different levels through procedures for planning business goals, improvising new products/processes and adopting fresh approaches and new routines/practices, thus strengthening firms' overall entrepreneurial capability.

Learning by doing

Recent research suggests that learning by doing and reliance on the firm's tacit and idiosyncratic knowledge is a largely adaptive learning mode characteristic of SMEs of a reactive orientation (Zahra et al., 2006). This study demonstrates that all the companies prioritized efficiency considerations, taking action to improve their routine procedures. Specifically, the owner-managers, R&D, design and production teams shared daily routines, repetitive tasks, exploiting their '*theory in use*' (Argyris and Schon, 1978). Occasionally, other more explorative learning was prompted in the face of environmental events. This was more common in high-tech companies and particularly the ICT companies with their shorter-life products and turbulent markets, which compelled the need for other, more exploratory learning processes (e.g. acquiring external expertise).

Having examined the interchange between exploration and exploitation in different sectors, Table 6.8 summarises the different learning processes that were identified across the examined firms at R&D and business (B) knowledge levels.

Table 6.8 Principal learning processes

	Learning mode	'By doing'		Trial and error		Networking		Imitation		Planning		Searching		Improvisation		Learn to learn		Training		*'Grafting'*	
	Knowledge type	R&D	B	R&D	B	R&D	B	R&D	B	R&D	B	R&D	B	R&D	B	R&D	B	R&D	B	R&D	B
CASES	YDREAMS	×	×			×	×	×	×	×	×	×	×	×	×	×	×				×
	BIOTECNOL	×	×			×	×			×	×	×	×			×	×				×
	BIOALVO	×	×			×	×			×	×		×	×	×	×	×	×	×		×
	ALTITUDE	×	×			×	×			×	×	×	×			×	×			×	×
	NFIVE	×	×			×	×			×	×	×	×	×	×	×	×				
	PELCOR	×	×	×	×		×						×	×	×						
	MOLDENE	×	×				×			×	×		×					×			
	SOMARQUES	×	×				×		×				×	×	×						
	ACSMV	×	×		×								×					×			

Trial and error

Recent research posits that by trial and error, tentative learning actions, utilizing part of the firm's 'bag of tricks', take enterprises beyond their normal routines and principally at the early development stage of the firm (Zahra et al., 2006). This study shows that learning in the traditional manufacturers needs to be understood in terms of their relatively unsystematic and less formal approach to management and innovation, focused on incremental improvements to existing products that strongly relied on their owner-managers. High-tech companies exhibited a wider learning scope and more methodical learning processes than traditional companies, apparently to avoid errors related to the planning of business/production goals and to assure shareholders and encourage further investment.

Networking

Networking through regular social interaction is an important mechanism by which new knowledge is identified and absorbed within enterprises (Zhang et al., 2006). Previous studies (Vale, 2004) have shown that Portuguese GOFs tend to build entrepreneurial capability through informal and distance networking. This study demonstrates how high-tech companies in particular are able to learn by networking and collaboration (including at R&D level) during the process of internationalization, and in order to promote their products and services globally. Conversely, traditional companies did not network much, nor did they exhibit much 'openness' in terms of exchanging organisational knowledge (e.g. at design level).

Imitation

Previous research has found imitation to be positively related to growth (e.g. Autio et al., 2000), whereas other studies contend that GOFs are market oriented and they innovate rather than imitate (Etienne et al., 2008), or are 'creative imitators' (Fontes 2007). This study has found that sector characteristics compelled firms to imitate their competitors to varying degrees. Thus, high-tech companies hardly ever imitated others' products or processes because these companies, some with proprietary rights, were specialists positioned mostly in markets based on inimitable core capabilities that distinguished them from competitors. ICT companies, as well, tended to search only for related and external knowledge from clients and partners that complemented their

existing core capabilities in terms of software platforms. Conversely, traditional companies imitated competitors more frequently.

Planning

Formal planning is generally accepted to be more prevalent amongst large, old and well-established companies (Zhang et al., 2006). This study of SMEs showed that the adoption of formal planning is sector specific. High-tech companies, operating within knowledge-intensive sectors, planned their business goals to set product development objectives and allocate long-term investment accordingly. As they operated within global and highly demanding investment sectors, strategic planning was necessary to anticipate potential radical changes (e.g. the need to spin-out or move abroad). Conversely, planning in manufacturing companies, reliant on self-funding and occasional public aid in some cases, tended to be relatively short-term and limited to the operational level.

Searching

It has previously been argued that GOFs adopt an active learning posture, retaining a willingness to review existing routines through constant searching (Sadler-Smith et al., 2001) and that the owner-manager is key in terms of identifying and selecting potential opportunities (Abdelgawad et al., 2013). In this study all the examined companies searched for new opportunities, through a process of searching for new clients and responding to new client needs (e.g. product specifications and functionalities). The traditional companies in particular, less reliant on wide networking and partnership and more based on their owner-manager searching efforts, tended to search frequently for external knowledge related to potential business opportunities or fashion tendencies.

'Grafting'

Prior research posited that firms can learn through acquisition, or 'grafting', whereby they acquire another business or new expertise to gain 'second-hand' access to new resources and capabilities (Huber, 1991). This research found that all companies were short of international business knowledge, partly because of their peripheral location and their R&D focused knowledge base. The solution in more affluent high-tech companies was to acquire external business expertise, or other specialized firms to

rapidly obtain the knowledge needed (e.g. Altitude). Acquiring (or '*grafting*') external expertise was therefore key to high-tech companies that operated within a more complex, intense and demanding environment. Conversely, traditional companies tended to rely on their owner's managers' industry knowledge base and were sceptical of the value of external expertise and/or lacked the means to afford it.

Improvising

Previous research has identified improvisation as a distinct type of learning in fast-moving competitive settings where unplanned experience influences action as it occurs (Moorman and Miner, 1998). This research found some instances where externally-gathered knowledge was applied by improvising, particularly in the traditional companies where new products and processes were improvised in order to respond to immediate client demand. ICT companies, on the other hand, tended to rely on more methodical and trustable processes (e.g. planning) and rarely, if ever, engaged in improvisation.

New ways of learning

Prior research has sought to advance understanding of how firms 'learn how to learn' in response to radical challenges to their existence and sustainability (Argyris and Schon, 1978; Liao et al., 2003). This study identifies how different propensities in this respect vary according to sector and knowledge intensity, with the high-tech companies achieving their outcomes through a greater propensity to engage in strategic planning and innovation practices that were more open, inclusive and reflective compared to the traditional companies.

Training

Prior research has posited that established companies are likely to be more deliberative in their approach to learning, as managers have more resources to explore the potential of existing approaches (Zollo and Winter, 2002). This research has evidenced that learning was principally based on action, rather than planning. The examined firms exhibited little prearranged, formal learning such as vocational or 'on the job' training.

Learning processes in high tech companies, operating within more complex and knowledge intensive sectors, exhibited greater variety compared to the traditional cases,

with internal experiential learning 'by doing' routine procedures being complemented with systematic searching, formal and complex networking arrangements and the acquisition of external knowledge and other companies.

In high tech companies, complementary external knowledge tended to be disseminated by more systematic business planning or, occasionally, by learning new methods through restructuring. In contrast, traditional owner-managers acquired external knowledge mainly through informal searching of opportunities, but also by imitating the competition with regard to product features and through informal networking with local distributors. This complementary external knowledge tended to be further integrated by less systematic experimentation with new products by trial and error and rapidly improvising in order to fulfil unexpected demand (see intersections of Figure 6.1).

The findings therefore show that high-tech firms were more dynamic in terms of their ability to combine external and internal learning modes. Although exploiting experientially their existing knowledge, they also carried out more exploratory learning behaviours - searching and networking with external stakeholders and planning detailed business goals. Occasionally they also acquired external firms and expertise, improvised new products and processes and changed the way they usually learn.

Traditional companies, on the other hand, were more efficiency-driven, less systematic in their learning, which was principally through experiential action on routine procedures and attempting new business solutions by trial and error. They also combined these processes with other more exploratory learning which includes searching new business opportunities, imitating competitors' processes and products, improvising occasionally new products and networking with distributors.

In traditional companies the learning scope was also narrower, and mostly confined to the management team. Significantly, traditional companies rarely learnt by systematic and methodical means, such as formal planning of business goals, recruiting external knowledge or by reinventing their learning methods during structural change. Internal experiential learning and external more exploratory behaviour (e.g. searching) was revealed to be prevalent across all companies.

The study shows that only the high tech companies could be characterised as proactive, fast and intense learners, whilst their traditional counterparts learnt more incrementally,

innovating through learning processes that were relatively 'closed' and narrow in scope. High tech companies were more demanding in terms of R&D cooperation that was critical to co-develop complex global products. In contrast, traditional companies (except Moldene), produced less complex and demanding products for which there was less of an imperative to engage in cooperative R&D (see Figure 6.1).

The owner-manager

This study has a particular focus on the idiosyncratic learning issues experienced by different owner-managers from different sectors. Prior research posited that in facing critical events, learning in SMEs is situated (Harrison and Leitch, 2005) and dependent on entrepreneurial learning (Cope, 2003). Moreover, learning modes may be differently combined over time (Colbert, 2005), with the role of the entrepreneur being key to developing the firm's entrepreneurial capability by sensing, selecting and shaping opportunities and synchronising capabilities accordingly (Abdelgawad et al., 2013).

The study supports that owner-managers are crucial in determining and mediating firms' openness with respect to innovation. Owner-managers were key knowledge gatekeepers, gathering and incorporating complementary external R&D and business knowledge in high-tech companies; and networking principally at the business level in traditional companies (e.g. with regard to client needs or fashion trends).

The study evidenced that entrepreneurial learning, focused on organisational leaders and their core teams, was also key to improving the firms' business knowledge and absorptive capacity, instigating and leading strategic change. The lead entrepreneurs of high tech companies were shown to sense and select opportunities in terms of business and R&D through interactive learning, driving their firms' openness towards external new knowledge and resources and moderating organisational tendencies towards closeness and protectiveness while shaping opportunities.

The results highlight that entrepreneurial capability is crucial in determining an appropriate balance between *openness* – needed to reap the advantages of collaborative innovation, with *closedness* – needed to protect intellectual property and core capabilities; and also in terms of balancing explorative with exploitative learning modes. The suggested ideal for a competitive enterprise - the central intersection of the

circles in Figure 6.1 - combines the collective development of new capabilities and increased absorptive capacities, while also protecting core knowledge and capabilities.

This study has identified the central role of the entrepreneur in maintaining and integrating firms' entrepreneurial capabilities through distinct combinations of learning modes. Indeed, owner-manager roles were diverse and varied across sectors in terms of knowledge intensity and learning processes, ranging from a more limited, individual searching and informal business-related role in traditional companies, to a more collective and formal role and exploratory learning modes, in the high tech companies. Owner-managers were therefore key in terms of explaining the varied entrepreneurial capabilities. In high tech companies, the owner-managers integrated diverse views facilitating organizational novelty (e.g. brainstorming sessions), whilst in the manufacturing firms the decision-making process tends to be confined to the top management team. Similarly, while the entrepreneurial capabilities of high tech companies were more dynamic in encouraging the creation of new capabilities (e.g. combining different R&D core capabilities and diversifying into new international businesses), the capabilities of manufacturing companies were focused on incremental improvements to design, production and marketing (see Figure 6.1).

The findings are consistent with other recent studies positing that Portuguese owner-managers often lack business knowledge (i.e. in terms of marketing, sales and customer service) and experience difficulties in dealing with business uncertainty and issues related to international markets (Pinho, and Martins, 2010; Teixeira and Grande, 2013). This study shows how GOF owner-managers′ address their lack of international business knowledge by engaging in international business networks, partnerships and exports, with the owner-managers of high-tech companies exhibiting a more proactive stance and those of manufacturing companies being more reactive.

This research shows how owner-managers' entrepreneurial learning was often situation specific and played a key role in terms of how firms built their entrepreneurial capability, responding to particular external and internal constraints, mediating firms' 'openness' in terms of innovation practices through specific learning processes and strategies, with varying outcomes (Figure 6.1).

High tech companies, operating within more turbulent, highly knowledge-intensive environments, and with their more educated owner-managers, responded to contextual constraints (e.g. lack of long term venture capital) through more formal and cooperative learning processes (e.g. involving partnerships and consortia) and more strategic outcomes (e.g. the creation of spin outs).

Conversely, traditional companies within more stable, less knowledge intensive sectors and with less educated owner-managers, engaged in more informal and simple learning processes (e.g. searching), in facing competitive issues and exhibited less significant entrepreneurial capability (confined to the management team) (Figure 6.1).

Learning outcomes

Prior research posited that entrepreneurial capability and innovation play a key role in the firm's growth process (Abdelgawad et al., 2013). Indeed, the firm's learning outcome, in terms of combination of knowledge resources and capabilities, can constitute a key competitive advantage (Hitt et al., 2001). This study found that, although most companies improved their competitive advantages as a result of their learning process, entrepreneurial capability varied according to sector and the underlying learning configurations, with high tech companies exhibiting greater dynamism and proactivity. The attained entrepreneurial capabilities and competitive advantages are summarized in Table 6.9.

Table 6.9 Learning outcomes

	High tech companies	Traditional manufacturer companies
Entrepreneurial Capabilities	• To combine different R&D core capabilities into unique technologies / products (e.g. electronic devices and 'cloud' technology); • To enter into new international businesses; • To '*graft*' new knowledge internationally (e.g. acquisition, hiring); • Strategic control and flexibility; • International networking capacity (e.g. sources of investment, franchising and licensing); • Continuous R&D improvement.	• Business capabilities in international marketing, searching and networking (e.g. distributors); • Flexible production, R&D, and decision making (e.g. design, top management); • Continuous production and marketing improvement; • Knowledge on dealing with European funding aids.
Competitive advantages	• Integrative approaches; • Spin outs; • Reputation; • Strategic business diversity (e.g. identification, accessing); • Business specialization; • Market proximity; • Prestigious partnerships; • Quality control; • Certification; • Investment capacity; • R&D capacity; • High service level; • Small size and self-financed.	• Market specialization approach; • Market diversity and proximity; • Small, flexible, and self-funded; • Reputation; • High service level; • Certification; • Client loyalty; • Production and design capacity; • Quality control.

Traditional companies operated in less complex and changing sectors and were found to have less intense learning processes, less engagement with 'open innovation' practices and were generally more reactive in dealing with learning issues. In this way, their learning outcomes were also different (Table 6.9.).

The companies evidenced distinct results from their process of sensing, selecting and shaping opportunities and coordinating resources accordingly (Abdelgawad et al., 2013). In high-tech firms, the entrepreneurial capabilities gained were reflected in terms of new skills in new technology to enter into different businesses, which resulted in, for example, customised software platforms or biotech ingredients. Conversely, in the traditional companies the entrepreneurial capabilities achieved were in terms of minor design and marketing adjustments, in order to target new markets and competences in international business. However, all companies shared a key point in gaining entrepreneurial capabilities for a customized approach in different markets and to diverse client needs.

To summarise, the study shows the varying degrees to which Portuguese GOFs were open to and able to access external knowledge and support, and the extent to which this involved learning at an international level in order to overcome domestic constraints. It contributes additional insights relating to the combination of learning processes that support GOFs' 'openness' in terms of innovation practices and the configuration of entrepreneurial capabilities. It emphasizes how these learning processes underlie the relationship between owner-manager, external knowledge acquisition, intra-firm knowledge dissemination and SMEs' responsiveness in the context of a peripheral/intermediate region.

7. Chapter seven: Conclusions

7.1 Introduction

This thesis has examined the case of Portuguese growth-oriented SMEs and, in so doing, contributes an improved conceptual understanding of their learning processes. Growth-oriented SMEs are considered crucial to economic growth and, as such, have become an increasing focus of academic and policy attention. Previous evidence and theory has identified the importance of organisational learning in applying knowledge resources, as well as entrepreneurs' experience and ability with respect to opportunity identification. There is only a limited understanding, however, of the interplay between learning processes and contextual factors over time (e.g. Zhang et al., 2006), particularly with regard to intermediate and peripheral economic contexts such as that provided by the case of Portugal.

The research framework adopted for this study combines insights from three different academic perspectives, namely organisational, entrepreneurial and regional theories of learning and how these relate to growth. This final chapter draws conclusions about the findings in relation to the specific research questions addressed and identifies the contribution to academic knowledge. It also considers some implications for management practice, reflects on the methodology adopted and its limitations, and identifies directions for future research.

7.2 Discussion of research questions

This section draws conclusions from the findings of the study and discusses them in relation to the research questions: (1) *What is the nature of the learning process in Portuguese growth-oriented SMEs?;* (2) W*hat is the influence of context upon learning processes?;* (3) *What is the role (and relationship between) entrepreneurial and organisational learning in responding to critical contextual events and challenges in Portuguese growth-oriented SMEs?; (4) How do we best conceptualize the learning processes of growth-oriented SMEs?*

7.2.1 What is the nature of the learning process in Portuguese growth-oriented SMEs?

The study has explored the learning processes of Portuguese growth-oriented firms (GOFs) within a setting characterised by significant weaknesses in terms of the national/regional institutions and the supportive relationships often seen as necessary for an effective innovation system. Although Portuguese GOFs were found to share many of the characteristics identified in the international literature on GOFs (e.g. as summarised in Table 2.1), there are also some important differences. The case study organisations were principally SMEs, their owner-managers were in general highly educated (particularly in high tech companies) and entrepreneurially experienced (particularly in traditional companies). High tech companies exhibited high learning intensity and varied learning processes, helping them to access and apply complex sector-specific external knowledge.

However, although growing in terms of sales, they exhibited little job growth and rarely sought to acquire external expertise. Traditional GOFs, operating within less complex contexts, showed sales growth while being driven by the growth dynamics of their sector (e.g. Moldene), without necessarily being very entrepreneurial or fast learners. In particular, the traditional companies showed little openness in terms of their innovation procedures or proactivity towards change, and low learning intensities in terms of their ability to explore and combine different learning modes.

The research has revealed the sector-specific nature of GOFs behaviours, including in terms of engagement with R&D partnerships, reliance on accumulated industry experience and the knowledge searching efforts of owner-managers. Firms' organizational characteristics also varied with sectors, whether top down/hierarchical in terms of structure and with innovation procedures and related interactions largely confined within firms' boundaries (as in the manufacturing cases); or more horizontal structures and encouragement of wider staff participation, as well as a greater openness to various forms of partnership working with external actors and the creation of new spin out businesses (as more often found in the high tech cases).

Although the literature indicates that SMEs' growth is strongly related to contextual variables (e.g. Wynarczyk et al., 2013), little research has addressed the learning and

growth modes by which firms adjust to their particular contexts (e.g. Macpherson and Holt, 2007). This study shows how the constraints posed by the Portuguese context prompted different responses. For instance, biotech firms' need of long term investment triggered greater networking effort and associated learning to identify alternative sources at an international level, whilst the demand for custom-made products drove improvements to their design skills, underpinned by experiential 'learning by doing'. Thus, learning processes and behaviour were found to have sector-specific characteristics.

The general economic crisis and lack of a coherent and supportive innovation system in Portugal (see section 3.4) also compelled the search for alternative means of supporting firms' growth and innovation efforts i.e. foreign shareholding / joint innovation projects in the high tech cases and reliance on their internal equity in traditional companies. Such diverse behaviours in a constrained economic/institutional context have received little attention in the literature, which has tended to focus on GOFs within better developed economic contexts.

By responding to this research question, this study contributes to knowledge in four main ways. First, due to the constraints of the domestic economy, all companies internationalised whilst relying heavily on their in-house capabilities. The lack of a cooperative regional culture and venture capital drove searches for alternative international investment sources (notably in the biotech cases), complementary partnerships (high tech firms) and self-funding (traditional firms).

Second, high-tech companies demonstrated more varied learning processes compared to their traditional counterparts, involving complex R&D knowledge, and more interactive learning with innovation partners leading to co-developed products. For the traditional manufacturers, on the other hand, internationalisation was limited to the export of products developed in-house, relying on their internal R&D and product design capabilities and imitation of competitors in responding to near and culturally familiar markets.

Significant innovation is often dependent on collaboration and sharing with external agents, although there can be tension insofar as firms are also motivated to protect their innovations and related intellectual property in order to remain competitive (Oakey,

2013). This study found that high tech companies, notably in the ICT sector, were more engaged in innovation partnerships leading to radical and co-developed new products. Both ICT and biotech companies tended to select trusted partners from whom they could gain complementary R&D knowledge, while also adopting measures to protect their internal core technologies. Conversely, traditional companies, with their less intensive R&D, tended not to engage in R&D partnerships – a contributory factor here being their concern to protect their design skills/registrations and trademarks (e.g. ACSMV). At the same time, innovation in traditional companies was restricted to incremental product changes and related improvements to their design and production capacities. Different configurations of learning processes and willingness to engage in co-operative partnerships in support of innovation therefore gives rise to varied outcomes.

Third, the owner-managers were found to be the principal knowledge gatekeepers, absorbing and disseminating external complementary knowledge via varied learning modes. Their role in moderating firms' openness in terms of innovation and building entrepreneurial capability over time has received little previous attention. Relevant and complementary external knowledge was often identified and brought into organisations by leaders and senior managers to be further applied in various ways, including in the restructuring the company i.e. in targeting new businesses (e.g. YDreams' spin outs) or redesigning its organisation (e.g. Moldene's new organisational design).

Significantly, organisational structures and cultures were found to be closely related to levels of engagement with external actors and 'open innovation' practices. High tech companies exhibited relatively open forms of governance, based on decentralized partnerships and spin outs, whilst the traditional companies tended to be rather 'closed' and with relatively top down hierarchical structures, with firms' learning processes appearing to be concentrated within top management teams. The study shows, therefore, how higher levels of environmental turbulence, complexity and knowledge intensity – notably in high tech sectors - necessitated greater organisational responsiveness and fluidity in terms of organisational boundaries, which contributed, through different firm's responses, to maintaining firms' entrepreneurial capabilities and preventing their decline.

Finally, the study shows how innovation processes and related learning lead to distinct entrepreneurial capabilities across the examined cases and sectors. In high tech companies, entrepreneurial capabilities revolved around the combination of distinct internal and external capabilities (e.g. internal technologies and externally acquired knowledge and shareholding) which resulted in unique products. Conversely, in traditional companies, entrepreneurial capabilities centred on the strong business competencies of owner-managers and firms' flexible production and design capabilities.

To further explore the nature of learning processes in Portuguese GOFs, we developed sub-questions from our understanding of the shortcomings in the literature on growth, and entrepreneurial and organizational learning. We take each research question in turn to show how they have been addressed.

7.2.2 The influence of context upon the learning processes

The Portuguese economic context and innovation system

This study shows how growth and learning processes are strongly influenced by external contextual variables relating to the economy, institutional environment and factors relating to innovation support, regional cooperation and education - i.e. the domestic innovation system. First, and in terms of positive influence, high tech firms in particular have benefited from Portugal's relative strength in aspects of higher level science education. More negatively, the study provides evidence of a Portuguese context of a small domestic market worsened by the ongoing global economic crisis, a shortage in terms of investment sources (e.g. venture capital) appropriate to high tech firms' long term needs, and a lack of collaborative networking amongst public and private actors. Also apparent were experiences of inefficient and restrictive regulation, perceptions of excessive taxation, and the limited availability of credit, further compelling firms to internationalize and to rely on their own internal capabilities. Biotech firms, for instance, were compelled to continuously improve their own internal capabilities (e.g. management skills), apply for alternative funding (e.g. European funding programmes), and to sell consultancy services to help secure much needed working capital.

Second, there was little evidence of successful collaborative partnerships between Portuguese enterprises in related sectors. Evidence of industrial clustering was scarce

and only a few favoured industries (e.g. cork and wine) have been targeted for public support. Likewise, there were few examples of purposive relationships and knowledge sharing with other local innovation actors, such as universities. The local/regional contextual environment did not therefore appear to encourage 'open innovation' and there was a lack of a regional cooperative culture (see section 3.4).

Such findings would seem to confirm that the domestic context of the case study firms is a long way from the idealised notion of a coherent business innovation system that is regionally embedded and based on close relationships between highly networked local actors (e.g. Boekema and Rutten, 2007; Etienne et al., 2008). In order to overcome the constraints posed by their domestic context, all the firm cases examined chose therefore to focus on developing relationships with partners and clients located abroad. The constraining influence of this regional insularity was particularly evident in the case of the traditional manufacturers, further reinforcing their relatively inward-looking cultures and limitations with respect to international business knowledge and innovation based on minor product and process adjustments.

The examined companies overall engaged in innovation mostly with distant international actors. However, the geographical distance between most firms and their clients, suppliers and technology transfer centres gave rise to varied responses in terms of how firms sought to balance openness and engagement with other actors with 'closeness' and IP protection. Some high tech companies had relocated their headquarters or spun out subsidiaries in order to be nearer to principal clients, markets and sources of R&D support (e.g. in the US) or acquired international business expertise (e.g. Altitude) and contracted consultancy advice (e.g. YDreams). On the other hand, traditional manufacturers adopted more informal approaches to searching for and acquiring simpler marketing-related knowledge, building on their existing local industry knowledge, and with more limited financial resources tending to limit their focus to nearby European markets.

The learning processes

The firms examined responded to the domestic economy and related innovation system constraints by combining internal and external knowledge through different learning processes and with different levels of openness towards external actors and sources of knowledge. The examined companies, overall, showed high levels of absorptive capacity in relation to business knowledge, principally gained at an international level, reflecting needs that were difficult to fulfil at the domestic level. Relative levels of learning intensity were also found to be closely associated with sector-related knowledge demands and the extent to which firms engaged with international networks and sources of academic knowledge. In particular, innovation practice in high tech companies involved combining internal R&D knowledge with new external knowledge, gathered through complex and formal learning arrangements and partnerships with clients. Other contributory aspects were acquisitions of firms and external expertise, and their development and provision of specialised consultancy services. Conversely, in traditional companies, innovation practices were particularly focused around in-house design capabilities, combined with simpler external business knowledge largely gained from distributors, wholesalers and clients. In high tech companies, growth was underpinned by radical innovation and complex interactive learning processes that often involved the creation of new organisational forms and related arrangements, such as spin outs (YDreams), licensing (Altitude), or franchising (NFive). In traditional companies, on the other hand, growth involved the creation of new stores and distribution points for their existing products.

The examined companies combined exploitative learning, involving incremental improvements to existing products and processes, with more explorative learning. The latter took many forms, with innovative outcomes resulting principally from planning collectively (or at management team level), international networking and partnership building, acquiring external expertise/other firms and researching new client needs. Other learning processes involved investments in vocational training to support R&D level experimentation with relatively radical new products; imitation of competitors' products and processes, and rapidly improvising new products by newly combining existing concepts, designs and resources. Additionally, all companies, the high tech cases in particular, had been compelled, at least once in their lifetimes, to learn new

methods of learning through rapid restructuring. The interview evidence reveals how exploitative and more experiential learning 'by doing' routine procedures were often combined with more explorative learning processes at the organisational level.

The study has been focused on the key role of lead entrepreneurs and senior managers and largely reliant on their accounts. In this respect, there was some evidence of the processes and mechanisms by which their learning was disseminated and applied within organisations. New external business knowledge brought into the firm by leaders/CEOs was often crucial in raising collective awareness (within high tech firms in particular) of strategic challenges, opportunities and the collective effort and planning that might be needed. Responses to external challenges and strategy relating to innovation included spinning out new businesses, acquisition of new expertise and the cultivation of partnerships (e.g. YDreams, Biotecnol, Bioalvo), accessing appropriate investment sources and income from selling services (e.g. Biotecnol, Bioalvo), or integrating complementary technologies (e.g. Altitude, NFive, Moldene). Conversely, in traditional companies the application of external knowledge tended to result in incremental modifications to a standard product (e.g. a new shoe, with a new sole to a new client) and by trial and error experimentation with new products specifically targeted at a new market (e.g. a new accessory made of cork for a new client sector).

Planning processes in high tech companies tended to be relatively 'collective' in nature and supported by professional knowledge management systems. Higher levels of inter-organisational learning were particularly apparent in the biotech companies. This seemed to be attributable to a combination of factors, including the long R&D lead times of their products and heavily reliance on long term investment which also reinforced the need for a systematized approach (i.e. in terms of planning a formal partnership) and transparency towards external investors, and with inter-organisational learning also being furthered through their networking efforts with other key actors, joint long term planning and acquiring external expertise ('grafting'). Significantly, ICT companies were heavily engaged in R&D partnerships, reflecting their need for complex knowledge and formal cooperation arrangements, while also relying heavily on external networking and knowledge acquisition by recruiting external expertise.

In contrast, traditional companies tended to rely on their in-house resources and demonstrated less openness to new external knowledge or partnering to support

innovation. Their learning processes were principally reliant on internal design capabilities and centred on their senior management teams. In this way, traditional companies exhibited relatively less intense learning and a lower diversity in terms of their learning processes. They rather showed a tendency to learn in a less systematic and professionalised way, for instance by sporadic approaches to investigating the needs of clients and related networking with local distributors. In addition, their business planning tended to be relatively informal and confined to the senior management teams.

Unlike the high tech cases, the traditional cases exhibited few instances of learning new ways of learning in the face of structural changes or investment in formal vocational training. Moreover, there was only limited evidence of high tech (e.g. YDreams) or traditional companies (e.g. SOMarques) occasionally learning by imitating competitors. Additionally, the studied companies overall, partly due to their financial limitations, rarely acquired other firms but rather engaged in international partnerships to develop (high tech) and commercialize (traditional manufacturers) innovations. Furthermore, high tech companies showed a greater propensity to learn new ways of learning in the face of strategic downturns compared to their traditional counterparts.

This research has highlighted the importance of the different forms of R&D and business knowledge used by firms and the varying extents to which they rely on external sources of support to meet their innovation needs and growth aspirations. In general, the high tech companies had a higher propensity to seek and apply external knowledge, i.e. through networking and collaborative partnerships, both in terms of business and R&D knowledge. In contrast, searching and networking in the traditional companies tended to be limited to the acquisition of business knowledge, while relying heavily on their internal production and product design/development capabilities.

Learning outcomes in terms of capabilities and competitive advantages

The study shows how firm level capabilities evolve out of learning from a combination of entrepreneurial and organisation wide learning (Table 6.8). Owner-managers contributed mainly by providing complementary business knowledge and strategic direction, but with important variations in terms of enabling absorptive capacities and firm propensities to engage in 'open innovation' practices. Interactive cooperative arrangements were central in the high tech cases, whereas production/marketing

capabilities and relatively informal approaches to searching were to the fore in the traditional companies (see Table 6.8).

The research found that high tech companies have evolved toward specialization in knowledge intensive business niches to flexibly combine capabilities through global partnerships, spin outs, and some acquisitions of other firms and external expertise that led to the capability of building integrative custom-made products. In contrast, manufacturers had developed strengths in production and design and developed capabilities in terms of flexible international design and marketing campaigns.

The research found that new capabilities developed by high tech companies often led to new products for new markets, whereas in traditional manufacturers' capability development contributed to continuous improvement in international business knowledge, design and certification. Explorative learning through cooperative arrangements and partnership governance (e.g. co-development of products through licensing) led to competitive advantages in terms of international R&D and business, whereas exploitative learning (e.g. 'by doing' the same products to the same clients) and informal searching at the business level, confined to the organisational boundaries and firms' hierarchical governance, tended to lead to more operational based competitive advantages (e.g. customised products). In this way, traditional firms, being more 'closed' and traditionally managed, with their entrepreneurial capability being confined to the top management team, were less open to external knowledge than their high tech counterparts that demonstrated a broader entrepreneurial capability.

The study also revealed that once companies had internationalized successfully, their newly attained capabilities and competitive advantages in dealing with international business led to improved growth in their domestic markets i.e. the reputation attained at distance, through prestigious partnerships became a ticket to admission to other more demanding clients. The increased internal knowledge appeared to augment the capacity to search for more external knowledge.

7.2.3 The influence of entrepreneurial learning in Portuguese growth-oriented SMEs

The study has shown how owner-managers and their contribution to the entrepreneurial learning of organisations was central in identifying gaps in knowledge and competencies, identifying and combining external business knowledge with internal R&D/design knowledge, thus building firm entrepreneurial capabilities.

Owner-managers are revealed to be the main knowledge gatekeepers, identifying and selecting opportunities and moderating organizational receptivity to new innovation practices. In the high tech companies, they were generally more internationally oriented and more involved in inter-organisational learning at an international level, and within the firm by shaping responses to opportunities and coordinating resources / capabilities. By contrast, owner-managers of traditional companies tended to be more oriented towards their domestic industries, targeting opportunities in near and culturally familiar markets. During the period of this study, owner-managers were found to have been central influences on the observed relative changes to the absorptive capacities of the case study organizations.

The study found that owner-managers from high tech companies (and also Pelcor, one of the traditional cases) were more highly educated and proactive in building purposive external links, thus promoting inter-organisational learning (e.g. by acquiring external expertise), which also contributed to new spin outs or internet-related businesses. Conversely, traditional owner-managers tended to be more reactive and focused on firms' design capabilities, and responding to nearby European markets. Accordingly, high tech owner-managers, from knowledge intensive sectors, performed a more collective and inter-organisational role in partnership (ICT firms), controlling the property to be patented and licensed (biotech firms). Manufacturers', on the other hand, in labour intensive sectors, and being more risk adverse, exhibited simpler and less open learning processes based on managers' experiential knowledge of client needs. The study shows therefore how individual entrepreneurial learning contributed to broader organisational and inter-organisational learning and innovation processes but with significant differences between the high tech and traditional cases.

7.2.4 How do we best conceptualize the learning processes in growth-oriented SMEs?

The discussion now turns to the final overarching research question: how to conceptualize the learning processes in growth-oriented SMEs, given what has been revealed about the interplay between contextual factors and processes of entrepreneurial and organizational learning. The research shows how contextual issues relating to the domestic economy and innovation system have compelled Portuguese GOFs to rely to varying extents upon their internal core capabilities, while also seeking new knowledge and from relatively distant innovation actors and resources. Overall, different learning processes underpin distinct responses to context, with diverse learning outcomes in terms of absorptive capacities, openness and entrepreneurial capability realisation (see Figure 6.1).

The study provides insight into what constitutes the substance of situated entrepreneurial learning in growth-oriented SMEs. Entrepreneurial learning in these companies is understood through the organising concepts of absorptive capacity, 'open innovation' and entrepreneurial capability. Learning processes were found to be more varied and the level of exploration in firms operating within more complex contexts was greater, with experiential learning being combined with more varied and higher level learning modes (e.g. complex networking arrangements), in building the firm's entrepreneurial capability over time. Also, external knowledge and entrepreneurial capability tended to be further integrated with varying intensity and learning modes, through distinct collaborative structures and profiles of strategic leadership.

7.3 Key Contributions

Theoretical contribution

The theoretical foundation of this thesis is organizational learning in SMEs and its influence on the main concepts drawn on – entrepreneurial capability, entrepreneurial learning and 'open innovation'. The research contributes to 'open innovation' theory (Chesbrough, 2003; Oakey, 2013) by adding understanding of how GOFs in less developed contexts seek to overcome domestic constraints by searching for distant support whilst relying heavily on their in-house and capabilities. The study also shows

how a reluctance to engage in 'open innovation' processes is reinforced by the IP protection concerns of conservatively managed manufacturing firms.

The study contributes to capabilities theory by responding to the call of Zahra et al. (2006) to clarify the link between learning modes and organisational development. The study therefore identifies combinations of learning processes and variations which can be related to different sectors and contextual constraints and with varying outcomes. This study underscores the interactive effect of different exploitative / explorative modes of learning in the building of substantive capabilities and how these contribute to the dynamic entrepreneurial capabilities needed for growth.

Furthermore, due to this analytic distinction of learning modes and capabilities, the entrepreneurial learning of GOFs was examined as an interactional process, revealing the underlying dynamics involved in the owner-managers' ongoing learning processes. Indeed, little is known so far regarding the role of the entrepreneur in the process of absorptive capacity (Cohen and Levinthal, 1990). The study identified the crucial role of owner-managers as knowledge gatekeepers able to access various sources of external knowledge and thus increasing firms' absorptive capacities, albeit to varying degrees amongst the cases studied.

Regarding the concept of entrepreneurial capability, previous literature has identified a need to reveal the configurations of different entrepreneurial capabilities in its multiple elements across firms and sectors and longitudinally (Abdelgawad et al., 2013). This study has found that the owner-managers are key to building and maintaining a firm's entrepreneurial capability through absorbing and disseminating knowledge through various combinations of learning modes.

Finally, the process by which firms apply new knowledge to achieve their goals (Sadler-Smith et al., 2001) remains unclear. This research identified the knowledge bases, learning processes and types of knowledge underpinning the firms' growth process, which differ according to the context. The success of high-tech firms was particularly dependent on their R&D capabilities, whereas traditional companies had a stronger domestic industry orientation based heavily on its design knowledge. Hence, in high tech companies, growth was underpinned by more complex interactive learning processes leading to more radical change and novelty.

Empirical contribution

First, this thesis extends the study of learning and growth to the empirical setting of the less favoured context of Portugal and by demonstrating that not all growth-oriented SMEs from certain sectors display a positive relationship with growth and learning, as previously suggested (e.g. Katz and Green, 2008). For example, the research showed that although growing in terms of sales, Portuguese GOFs exhibited little job growth and, in some cases, little propensity to engage in 'open innovation'. Furthermore, high growth is often episodic and unlikely to be consistently maintained over the long term.

Second, the research has revealed the idiosyncratic and sector-specific nature of the learning processes of GOFs within a less developed economic context, bringing to the fore the differences between sectors and how the entrepreneurial learning of owner-managers is central to how sector related opportunities and constraints are addressed over time.

Third, although the spatial dimension has been addressed in interactive learning (e.g. Oakey, 2013), the significance of proximity in clustering has generally been overplayed in intermediate contexts. This research has shown how proximity does not necessarily enhance close collaboration and clustering. In fact, in the Portuguese context clearly does not encourage 'open innovation' at all, as all the case study GOFs internationalised sooner or later to achieve markets, funding and partners.

A further empirically relevant contribution is the role of different types of knowledge and how they are absorbed. This study has demonstrated how firms with greater learning intensity – mainly the high tech cases - are able to combine their internal R&D knowledge with externally gathered business knowledge. Conversely, low knowledge intensity manufacturers tend to rely on their internal design knowledge combined with external absorbed business knowledge.

Finally, the literature on capabilities posits that the nature and quality of both capabilities and organizational knowledge stem from the resources and learning processes the firm carries out, with it being opportune to link the learning processes to its outcomes (Zahra et al., 2006). This research shows that new capabilities developed through explorative learning by high tech companies often lead to global products for global markets, whereas in traditional manufacturers, capability development through

exploitative 'by doing', contributed to continuous improvement in international business knowledge and design competences.

7.4 Overall conclusions

To summarize, this research highlights the interplay between firms' capabilities and how the contextual challenges and opportunities are addressed through different learning processes. Owner-managers/leaders were shown to play a central role, leading to distinct learning outcomes in terms of firms' absorptive capacity, capabilities and competitive advantages. In the relatively peripheral (or intermediate) context of Portugal, GOFs face particular challenges relating to limited domestic markets, insufficient investment sources, weaknesses in the system of education and training, knowledge and institutional constraints, and a general lack of a co-operative culture relating to business innovation. These contextual characteristics have contributed to the lack of regional cooperation and openness in terms of innovation, with Portugal being quite different to the relatively well endowed regions with their supportive institutional contexts that have featured in many previous studies on business growth and learning.

Spatial proximity and clustering of business and other institutional actors (e.g. universities) did not necessarily lead to the development of purposive relationships, with the case study companies more often engaging in distant trust-based networking and partnership building with key international actors or, in the case of traditional manufacturing companies, relying on their entrepreneurial experience and targeting nearby and familiar (culturally close) international markets. Either way, the 'innovation system' in which these companies were engaged was highly internationalised, while building on in-house strengths in terms of R&D, design and production skills developed at the domestic level. However, traditional companies showed narrower innovation behaviours as their networking tended to be restricted to the commercial level (i.e. knowledge relating to markets and client preferences) and innovation was strongly based on the feedback and needs of established clients.

The research found that owner-managers have carried out a central role by embedding their entrepreneurial learning into the wider process of organisational learning, and firms' entrepreneurial capability and absorptive capacity. External business knowledge, obtained by owner-managers through diverse activities (or modes of learning), was

identified as crucial in building firms' absorptive capacities in all the studied cases. The owner-managers, tended to moderate their firms' 'openness' in terms of innovation by identifying and selecting potential opportunities and setting cooperation arrangements at inter-organisational level whilst protecting their firms' core capabilities.

The research shows that all companies were driven to internationalise sooner or later to overcome domestic constraints and explore new opportunities. As suggested by the literature (Autio et al., 2005), new internationalizing ventures demonstrated greatest absorptive capacity in their ability to explore new international businesses. Nevertheless, a distinction between high tech companies and traditional companies, with the former adopting more explorative learning behaviours and the latter more exploitative learning behaviour (e.g. as suggested by Zhang et al., 2006) was not evident. Instead, all of the examined companies exhibited both explorative and exploitative learning behaviours, with the former being led by owner-managers (or senior management team), the principal knowledge gatekeepers, and exploitative learning behaviour also occurring at the organisational level, mostly based on stable local resources, such as skilled labour. Additionally, high tech companies more often demonstrated collective learning behaviour at the organisational and inter-organisational levels, improving their entrepreneurial capabilities, for instance through improvising 'brainstorming' sessions or learning new ways through restructuring, whereas in manufacturing companies, instances of two-way organisational learning during their relatively stable life spans were rare.

The research shows that in the most proactive cases, responses were driven by the speed of developments in new technology sectors, thus necessitating intensive learning in order to remain abreast of such developments, whereas the more reactive responses of the traditional cases were associated with more stable environments (e.g. lengthy technology cycles) and with incremental learning and innovation being more prevalent. Hence, the learning outcomes, entrepreneurial capability and modes of growth were of a more strategic nature in high tech companies (e.g. combinative products, spin outs) and of a more operational/ marketing nature in traditional companies (e.g. operational flexibility, organic growth).

In general, high tech firms exhibited higher levels of absorptive capacity during the study, as reflected in their greater variety and frequency of adaptive changes and

innovative developments, such as establishing specialized spin outs near key markets, or developing integrative solutions by combining different technologies. These companies had augmented their capabilities of strategic restructuring through international spin outs, long term partnerships, headquarters relocation and grafting expertise. Traditional companies, on the other hand, were found to have increased their absorptive capacities in terms of design and international business knowledge, developing capabilities in international business.

The findings indicate that such increases in absorptive capacity were particularly related to behaviours associated with the concept of 'open innovation' (e.g. forms of networking governance), and involved particular combinations of learning modes and scopes, in which entrepreneurial learning played a central role in moderating the firms' openness towards innovation collaboration. The speed and turbulence of ICT develop means that success and growth is highly dependent on high levels of exploratory search, networking and inter-organisational learning, involving both R&D and business knowledge. Biotech companies dealt with very specialized/unique products, heavily demanding in terms of investment, and thus their learning behaviours and modes tended to be narrower in scope, focused on searching and planning for long term projects/investments while prioritising the protection of intellectual property and core R&D capabilities.

Conversely, traditional manufacturing companies, within less knowledge intensive industries and faced with a relatively stable environment therefore tended to exploit existing knowledge, engaging less often in 'open innovation' and external learning modes, short term planning, and with learning principally focused around the owner-manager and senior management teams. These companies preferred external learning processes such as imitating competitors' products and processes and searching informally for client needs, at the business knowledge level and were less likely to undertake radical new ways of learning through a firm's restructuring, such as could lead to a new product to a new market.

The study shows that owner-managers were of special importance to all firms, playing a key role as knowledge gatekeepers, collectively embedding external acquired knowledge into organisational learning and mediating the firms' openness in terms of innovation. The process allowed complementary external R&D/business knowledge to

be linked with internal R&D/design/productive knowledge in order to seize opportunities and coordinate the firm's resources / capabilities, and was very systematized and participative in high tech companies (particularly biotech).

The research found that local R&D internal capabilities were core in high tech companies, whereas local design and production capacity were of particular importance in the case of the traditional manufacturers. Despite their different industry contexts, responses, learning behaviours and outcomes, both high tech and traditional manufacturing companies were able to achieve high growth rates, although in all cases periods of high growth tended to be episodic rather than sustained over time. Hence, the research has found it more appropriate to categorise these companies as Growth-Oriented Firms (GOFs) rather than High Growth Firms. However, some had limited learning intensity and limited openness in terms of innovation, which can be attributed to their stable context, conservative owner-managers and reduced absorptive capacity.

7.5 Implications for management practices

During the fieldwork period of this study Portugal was experiencing the consequences of a global economic recession, which has worsened its long standing structural problems and limitations in terms of policy support for business and innovation (see section 3.4). This study has also highlighted businesses' experiences and negative perceptions with respect to regulation. Significantly, according to the OECD (2012), although Portugal has made progress in the development of policies for better regulation (e.g. the Simplex programme), there remains a need for the Portuguese public sector to become more cost-efficient and better able to contribute to a supportive environment for business and innovation. The country continues to present important regulatory limitations, such as significant delays in the court system and EU regulations that are still below the EU average in terms of the efficiency of their implementation (OECD, 2012).

In addition to providing useful insights into the entrepreneurial learning literature, this research suggests that there is a need for support for GOF owner-managers in improving firms' absorptive capacities and ability to access and benefit from external support. In this respect there is a need to address the inward-looking and self-reliant culture and practice of 'traditional' companies in particular, and their preference to avoid becoming

reliant on external resources and to rely instead on limited self-finance. Also, evident was a lack of collaboration, even in those firms within relatively concentrated industrial clusters (e.g. Moldene and SOMarques). There was little evidence of positive benefits from economic spatial concentration as firms only collaborated occasionally, notably in response to a need to enhance their project delivery and production capacities through subcontracting arrangements (e.g. SOMarques and ACSMV). There are important barriers to collaboration at the domestic level and subsequently a need to create more effective institutional mechanisms to broker and coordinate local innovation partnerships.

These findings suggest that interventions to help develop and support learning processes within GOFs in intermediate/peripheral regions are needed. GOFs that are particularly limited by an over-reliance on owner-managers' entrepreneurial knowledge and internal core capabilities, should be selectively targeted with appropriate support to expand their opportunity horizons, for instance in terms of international business knowledge. By becoming more familiar with the more complex aspects of their business and operating environment, these owner-managers also became more understanding of the type of assistance needed to address their specific needs.

Supplementary assistance is therefore paramount to these companies seeking to grow through internationalisation. Previous entrepreneurial experience gained through experiential learning might be adjusted to the context of a specific GOF through managerial training (e.g. formal courses and export seminars), in order to provide the appropriate knowledge to help these owner-managers develop a stronger client focus and to become more responsive to the potential of new international markets.

7.6 Methodological discussion – reflections on what I have learnt and some limitations of the study

This PhD has been a learning experience for the researcher and it is appropriate to reflect on the approach adopted and some inevitable limitations of such a small-scale study. In the course of undertaking the empirical aspect of this study a number of challenges were encountered which necessitated some adjustments to the original research design and a flexible attitude towards what was feasible, particularly given the

limited resources available to the researcher and given the self-funded nature of the study.

The research involved nine qualitative case studies of enterprises selected to represent two broad sectors and six industry sub-sectors, and so contributes towards theoretical insight rather than statistical representativeness. Given that the study was also conducted within the specific context of Portugal, caution needs to be exercised when seeking to generalize the findings to other industries and regions. A further main limitation relates to the difficulties experienced in accessing firms' staff and other related external actors, meaning that the study was heavily reliant on the accounts of the owner-managers and CEOs. Potential participants from the lower ranks withdrew their support, expressing concerns that their comments might conflict with the owner-managers' or that they would reveal confidential data. Also, owner-manager interviewees withdrew their support in relation to the provision of internal documentation, which may be a reflection on their inward-looking nature and/or their lack of trust towards a university-based researcher to maintain strict confidentiality. Likewise, most were unwilling to facilitate access to relevant external actors (e.g. suppliers) for fear they would reveal sensitive data. Hence the interview evidence is largely dependent on the accounts of top strategic leaders in the nine case studies. Nevertheless, seven interviews were conducted with relevant partners, clients, or suppliers, with the permission of the owner-managers in these cases, to some extent helping to reduce bias and enhancing the robustness of the analysis.

The initial intention of the researcher to observe important in-house organisational events, and to encourage owner-managers to complete a diary log – i.e. to write down relevant learning issues – had to be abandoned due to lack of co-operation, also constituting a methodological limiting factor. Participants were generally unwilling to adopt a diary log or allow the researcher to observe meetings of strategic importance.

The development of the proposed model (Figure 6.1) required much insight. Combining theories relating to entrepreneurial (e.g. entrepreneurial capabilities), regional (e.g. 'open innovation' theory), and organizational (e.g. absorptive capacity) levels was undertaken with apprehension, particularly given the study's heavy reliance on the accounts of owner-managers. Although they have been used separately, these theories have rarely been combined within other studies or, to the writer's knowledge, been

applied together to the intermediate and less supportive Portuguese context and across different sectors. To render visible the learning processes of those growth-oriented SMEs, data was analysed in a 'creative' manner, combining their analytical / theoretical roots and contributing to the researcher's methodological learning and insight.

The study promotes theoretical development by linking methodological considerations and empirical enquiry with constant reference to the specific sectoral contexts involved. This was strengthened through inclusion of the views of other relevant actors, such as the industrial associations or firms' suppliers and partners, thus providing a degree of triangulation with the accounts of owner-managers. The study also benefitted from the constant guidance of the researcher's supervisors, which led to the proposed model being refined further. The later inclusion of perspectives from the literatures on 'open innovation' and entrepreneurial capability was also an important exercise in terms of updating and strengthening the literature review with new theoretical developments.

At the beginning of the study, the researcher was not aware of the key sources of knowledge and learning processes that underlie the growth of SMEs in intermediate contexts. Hence, the 'open innovation' literature revealed the potential tension between firms' willingness to share their capabilities in co-operative partnerships and their motivation to conceal core competences and related IP. Entrepreneurial capability theory unveiled the varying role of the owner-manager in identifying, selecting and shaping opportunities across sectors, as well as in coordinating the firm's resources accordingly. This added significant value to the wide range of literature covering individual entrepreneurial learning (e.g. learning issues) and collective organizational learning (e.g. absorptive capacity). Furthermore, with the wisdom of hindsight, the semi-structured interview schedule applied in the subsequent interviews was improved following a first pilot interview (in the case YDreams), particularly by including probes to elicit greater insight on key issues while omitting some questions found to be unnecessary.

To summarise, a real limitation of this work has been the cautious attitude of the owner-managers of the case study firms which limited the researcher's ability to include the perspectives of other actors, both internal and external to the enterprise. Answers were evasive and further interviews with other staff members were either postponed or never allowed. This limited consideration of multiple perspectives which was a downside

with respect to the aim of furthering understanding of organisational and collective learning dynamics. The lack of contribution from other views on organisational learning was a limitation of this research, which leads us to the discussion of future research.

7.7 Future directions for research

This study has explored a complex topic and has been informed by findings and ongoing theoretical debate in the extant literature. Further areas for additional research are proposed below.

First, since there is relatively little research on the learning processes of growth-oriented SMEs, further research utilising other methodologies is essential. This would aid in developing the organisational learning aspect of this study by including the perspectives of a wider range of actors. It would also be of value to conduct research to cross-evidence the conclusions with other methodological tools, such as a diary log, observation, and interviews with other organisational actors and external stakeholders, and thus address a limitation of this research. To allow generalisation of the conclusions, it would also be of value to conduct quantitative research with a larger sample of GOFs and include a larger number of interviewees per company. For example, it would be wise to strengthen future analysis through a survey, periodically applied to firms' learning indicators over a period of time.

Second, further studies that explore how entrepreneurial capability is built in intermediate contexts are needed to further clarify the links between entrepreneurial learning and contextual issues. In general, a worthy goal would be to combine the understanding gained here with entrepreneurial capability theory (Abdelgawad et al., 2013) and particularly to better theorise how firms in peripheral contexts learn about and connect with key global markets and innovation actors.

Third, questions around 'open innovation' and entrepreneurial capability should be explored widely throughout the organisation, particularly as this allows for more understanding of entrepreneurial learning and the team's role in this. Abdelgawad et al. (2013) suggest that obtaining different views and integrating entrepreneurial capability throughout the organization is positively related to the creation of new opportunity realization paths. Zhang et al. (2006) also point out the importance of disseminating individual entrepreneurial learning throughout the firm.

Fourth, this study has only touched on structure and strategy in discussions around collaboration. Abdelgawad et al. (2013) note that structure has a part to play in the embeddedness of entrepreneurial capability that should flow in a decentralised way across organisational units. Nicholls-Nixon (2005) note that GOF owner-managers are able to develop a structure that enables '*self-organizing*' learning, for instance by emphasizing relationship building. With internationalisation, more sensitivity toward structural / strategic analysis would be valuable. Future studies could analyse how entrepreneurial learning and capabilities interplay with different strategies / structures.

Fifth, there could also be a focus on more specific themes concerning the role of owner-managers corresponding, in part, to the key elements of the conceptual framework set out in Figure 6.1. While past research on entrepreneurial learning demonstrated the impact of contextual events, there is scope for detailed mapping beyond what has been shown in this study. Additional research should be conducted to further examine the role of different learning configurations in legitimising distinct 'open innovation' regimes and to elaborate typologies of entrepreneurial capability. In addition, another goal for research concerns the need to study the implication of firms' contextual networks in building their learning capabilities.

Finally, there is a need to further explore the situated and idiosyncratic nature of entrepreneurial learning and how this links to 'open innovation', entrepreneurial capabilities in other different contexts. By applying different national and sector contexts through a longitudinal approach, entrepreneurial learning scholars may gain new insights into what, how and why questions, such as: what are the situated processes that owner-managers engage in over time?; what is the role and potential of local contexts and related support in promoting 'open innovation' and the building of entrepreneurial capabilities?; how are the other staff members' views and organisational learning taken into account in the process?

Overall, there is considerable scope for future investigations to advance the research started here, and to provide further understanding of both growth and entrepreneurial learning within peripheral contexts and the intersection between the two.

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Appendix i

1st interview

Learning Processes in Growth-oriented SMEs

Topic Guide for Face to Face Interviews with
Owners Managers

I am developing a PhD thesis at Middlesex University London about learning mechanisms in SMEs. The study intends to understand the longitudinal process of learning within the development of growth-oriented SMEs.As part of this study I am conducting interviews of owner-managers to bring additional insight into their firms' learning processes. The interview should take about an hour.

This interview aims at focus on the main issues in your business activity over the last three years. I am interested in events that were of importance to you in this period and how you (and your firm) handled them.

The main topic areas that I would like to discuss with you are:

- Some background details about yourself and the business;
- Relevant changes and environmental critical events;
- The learning processes by which you (and the firm) has dealt with change;
- The influence of such processes in firm's ability to learn.

Interview record - to be completed in advance:

Company:	
Address:	
Contact details:	
Year of foundation:	
Interviewee:	
Position of interviewee:	
Business founder (s):	
Type of business/Industry	

Interviewer:	
Date:	

1. Background Details

(This section aims at capture the previous experience of the entrepreneur, the firm's knowledge heterogeneity and stock, the firm's learning / innovation intensity and its growth rate)

1.1 Background and current role of owner-manager/founder (s)

1.2 Background and current role of other key managers (e.g. middle managers)

1.3 Year of establishment and main historical events

1.4 Main activities

1.5 Product/markets where the firm operates

1.6 Number and level of training of employees

1.7 Rate of introduction of new products

1.8 Sales growth (last 3 years)

1.9 Estimated sales

2. Environment

2.1 I would like you to tell me what significant changes have you implemented in the last 3 years?

(This question aims at understand the relevant contextual critical events endured by firm / entrepreneur and decisions taken to deal with them)

Prompts:

Products?

Processes?

Staff?

Market?

Technology?

2.2 What forces have driven these changes?

(This question aims at bringing additional insights over the mentioned critical events, namely, namely their interrelatedness with macro, micro and firm dimensions)

Prompts:

Internal (e.g. performance)?

External (e.g. industry, spatial (local, regional, national, international)?

3. Firm's Learning Mechanisms

3.1 How has the business managed these changes?

(this question aims at explore different modes of acquiring knowledge and different levels of learning, either more low level incremental, or more high level transformational)

Prompts:

Improving processes?

Changing procedures?

Planning?

Imitating others?

Improvising?

Networking?

3.2 What have been the facilitating factors in these changes (e.g. firm's previous knowledge, partnerships, sources / channels of knowledge, location)?

(This question aims at understanding the relevant actors and sources of knowledge that intervene in the previously pointed learning modes and levels)

3.3 And the limiting factors?

Prompts:

Can you explain?

3.4 What has been your personal role in managing these changes (e.g. identify opportunities)?

(This question aims at explore the role of entrepreneurial learning in the organisational learning equation)

4. Absorptive Capacity

4.1 What has been learnt during these changes?

(This question aims at understanding the influence of those learning events upon the firm's absorptive capacity)

Processes?

Products?

Markets?

4.2 How did such learning occur?

(This question aims at understanding which agents other than entrepreneur, internal or external to the firm, contribute to firm's absorptive capacity)
Prompts:

Externally?

Internally?

By whom (external, internal actors)?

Can you give an example?

4.3 Has this learning influenced what the firm is capable of doing now?

(This question intends to understand if new learnt knowledge contributed to firm's absorptive capacity improvement and how)

Prompts:

Investment?

Products?

Processes?

4.4 How?

4.5 To what extent is these changes successfully learnt / implemented?

(This question intends to explore if new learnt knowledge was successfully distributed and applied within the firm)

Prompts:

Innovation in products?

In processes)?

4.6 Can you give an example?

5. Concluding reflections and potential further involvement in the study

5.1 Are there any remaining important issues not yet covered that you would like to comment on?

5.2 Do you know of any other key actor(s) involved in these changes who would be of interest to interview?

5.3 Are there any reports or supplementary paperwork relating to these changes that would be useful for me to see?

5.4 As part of this longitudinal study over two years the aim is to triangulate different sources of information at different times. This would involve further interviews and observation of relevant events. Would you be willing to help me in this?

Prompts:

In a future interview (let us say next year)?

In observing in site an important change in the future?

Thank you very much for your help.

2nd Interview

Learning Processes in Growth-oriented SMEs

Topic Guide for Face to Face Interviews with

Owners Managers

I am developing a PhD thesis at Middlesex University London about learning mechanisms in SMEs. I interviewed this firm last year attempting to understand the longitudinal process of learning within the development of growth-oriented SMEs. As part of this study I am now conducting follow up interviews of owner-managers to bring additional insight into their firms' learning processes.

This interview aims at focus on the main issues in your business activity over the last year, and I would like to focus on those that are the most important to you. I am interested in the things that were your main attention last year regarding your business activity and how you (and your firm) handled them.

The main topic areas that I would like to discuss with you are:

- Explore some details about yourself and the business in the last year;
- Explore relevant changes and environmental critical events occurred in the last year;
- Explore the role of organisational learning on dealing with those changes;
- Explore the impact of such organisational learning processes on firm's new capabilities.

Interview record:

Company:	
Address:	
Contact details:	

Year of foundation:	
Interviewee:	
Position of interviewee:	
Business founder (s):	
Type of business/Sector	
Interviewer:	
Date:	

2. Background Details

2.1 Have there been any changes on the background and current role of CEO/founder (s) and of other key managers?

Why?

2.2 Have you achieve your business objectives for the current year?

Can you explain?

2.3 Can you estimate its effect on firm's growth in sales and number of employees in the current year?

6. Environment

From our interview last year it seems like the most important issues were:

6.1 Were these the main ones or do you have in mind other issues that came up in the meanwhile (e.g. products / markets / technology/institutional)?

Can you explain?

6.2 What were the triggers for these changes?

Internal triggers?

External triggers?

6.3 How has this impacted your business activity now (e.g. new products services /investment, staff, strategy, market)?

7. Firm's Learning Mechanisms

I would like to explore how you learn to deal with the above mentioned issues. I would like to talk about:

3.1 How did you respond to those critical events?

Improving processes?

Changing procedures?

Planning?

Imitating others?

3.2 What have been the main barriers and facilitating factors in the business development of your firm over the last year (e.g. product expertise, management expertise, networking, partnerships, external aid, new opportunities, new financing sources)?

Can you explain?

4 Absorptive Capacity

4.1 Where did you learn the needed knowledge?

Externally?

Internally?

4.2 How such learning occurred?

Can you give an example?

4.3 Have been in the last year any changes regarding the role of CEO and of other key managers?

Why?

4.4 Who in the enterprise has the skills for the product / business development now?

4.5 What are the main difficulties in mastering such new capabilities?

Can you give an example?

4.6 How such new learning has influenced what the firm was able to do before (e.g. new products / markets)?

4.7 To what extent is these changes successfully learnt / implemented?

Can you give an example?

5 Concluding reflection and potential further involvement in the study

5.1 Are there any remaining important issues not yet covered that you would like to cover on?

5.2 Are there any reports or supplementary paperwork relating to these changes that would be useful for me to see?

Thank you very much for your help.

Appendix ii

		A - Ydreams	B - Biotecnol	C - Bioalvo	D - Altitude	E - Nfive	F - Pelcor	G - Moldene	H - SOMarques	I - ACSMV
a -The context	1 - Knowledge base	All the managers were researchers. (aA1i);	I am a chemical engineer (CEO). I started 20 years ago as a PhD in research on animal biology (aB1i);	The board is today fully Portuguese and the firm is managed by technologists' experts in R&D (aC1i)	The team is little but we have here the core competences, the R&D (aD1i)	The team...they are graduated people...with a strong component on R&D (aE1i)	The owner-manager comes from the area of marketing; she is graduated and bet on this business (aF1ii)	Those owner-managers I work with worked for long time on this industry and started as employees in other firms (aG1ii)	One owner-manager was initially an employee of the firm (aH1ii)	I was already the president of FENADEGAS (and I was its paymaster during another 6 years (aI1ii)
	2 - Learning triggers	There are excellent people to fulfil functional areas but not to management (aA2iii);	The consultants...hav en't recognized for years our investment on intangible assets (aB2iii)	In Portugal... there are not strategic and management competences. (aC2iii)	We had created expectation through a structure of shareholders (aD2v)	The need to change comes always outside in (aE2ix)	An intense competition which demands us to innovate above our own innovations (aF2vi)	The automotive client is much awaiting for someone to take the first step (aG2ix)	I could even internationalize to distant regions but I do not have the productive capacity (aH2vii)	At this point we have reached our limit regarding productive capacity (aI2vii)
	3 - Responses	To hire a professional manager (aA3xxvi);	we've start in this room meetings to optimize strategies in 2012 (aB3xxviii)	We have been hiring new people in the recent years...with knowledge in business development (aC3xxvi)	We used to travel...The nets are informal and formal and we used both (aD3xxv)	The firm born globally because it started up with a French partner (aE3xxv)	Now we have three additional managers, although I am still leading (aF3xxvi)	At organisational level, it was designed an additional commercial department for plastic moulds (aG3xxvii)	There is now a fashion tendency that we must keep up with and therefore we make hundreds of samples (aH3l)	Regarding the filling line we feel the need of changing it (aI3l)
b - Learning processes	4 - Learning modes-level	our main source of knowledge starts to be internally... mould by the experience (bA4lx)	Our experience is fundamentally 'learning by doing' (bB4lx)	It is always a process of 'learning by doing' (bC4lx)	This business phase is more incremental than inventive and we must adapt continuously (bD4lx)	Our experience is paramount to manage such continuous change (bE4lx)	The previous knowledge has been very useful ... it has been a continuous learning. (bF4lxi)	Here, the new processes are mainly production and efficiency related. (bG4lxi)	The procedures are always the same (bH4lx)	There aren't any ruptures with the past. We simply are improving continuously (bI4lx)
	5 - Learning scope	I only orchestrate and the others play their instruments (bA5lxxx)	CEO has a paramount role on this...networking is highly centred on him (bB5lxxx)	I know what to do and I must look for allocate resources to do it,. (bC5lxxx)	My role is to assure the best technology used in the product and to set priorities (bD5lxxx)	I do the planning, I do the strategy and I am a technician... I do the business development (bE5lxxx)	the owner CEO is the first to approach the client (bF5lxxx)	There are other two commercial directors who meet and discuss strategies but in the end report it to me (bG5Lxxx)	We are autonomous but we communicate in a daily basis,. (bH5lxxx)	It is the direction board who deal with those issues (client demands) (bI5lxxx)
c - Learning outcomes	6 - Capabilities	we intend to keep an integrated perspective at product level (cA6lxxxiii)	The future of the enterprise depends on us top / middle managers (cB6lxxxv)	now we already developed some products, get some partners and clients (cC6lxxxvi)	We have one single world product line along 800, 900 client production units (cD6lxxxiii)	We synthesize on it all the technologies we have ...into a single one (cE6lxxxiii)	this issue triggers us to look for another suppliers or partners (cF6lxxxvi)	We have managed to improve the process which is a partnership after all, (cG6lxxxvi)	Partnerships are important as we have now two or three fabrics working with us (cH6lxxxvi)	We were not the first to go to Angola but I knew somebody in Angola (cI6lxxxvi)
	7 - Competitive advantages	We intend to keep an integrated perspective at product level (cA7xci)	...a market niche where we turned out specialists: (cB7xcv)	as we can be the innovation unit of Procter and Gamble...because we have all things integrated: (cC7xcv)	Our business is to sell distinct software that can be customized (cD7xcii)	We hold a monolithic software product which presents all the functionalities (cE7xcii)	We are focused primarily on the fashion business before we diversify (cF7xciv)	it is very effective as we hold a state of the art machinery park, an integrated organisational system (cG7xcii)	We still being positioned on the business of shoes to ladies, (cH7xcv)	We have a good financial condition to obtain financing (cI7xcvii)